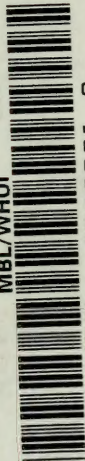


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THE
EARTH AND ITS INHABITANTS.

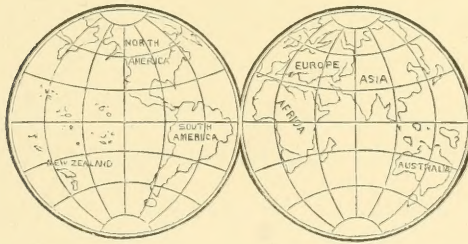
SOUTH AMERICA.

BY
ÉLISÉE RECLUS.



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VOL. II.
AMAZONIA AND LA PLATA.



ILLUSTRATED BY NUMEROUS ENGRAVINGS AND MAPS.

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A PARTING WORD.



N completing this long work, begun in the days of my youth, I may congratulate myself on the good fortune by which, in the course of a life not lacking in stirring incidents, I have been enabled to fulfil my engagements of regular publication, without ever once breaking faith with my readers. At the same time I am well aware that the best intentions and most conscientious labour would have been inadequate to such an undertaking, but for the devoted fellow-workers who have constantly aided me by their researches and advice.

A feeling of gratitude must therefore be uppermost, and my thanks are accordingly given to all friends who have directly or indirectly helped me by notes, studies, correspondence, corrections, encouragement, or criticism. But this acknowledgment can no longer reach all those to whom it is due! A retrospective glance shows the path marked at intervals by the memory of comrades in work garnered by death. Towards them above all my thoughts are turned at the close of my task. On this last page I record the name of Emile Templier, who sought me out on the pontoons of Brest with a view to the publication of the long contemplated *Earth and its Inhabitants*.

This period of twenty years, long relatively to the life of a man, is as nought in the history of the Earth; yet how well it has been utilised! How many discoveries and explorations have followed one on the other, adding to our previous

knowledge and requiring us to modify our description of the world! Although the mystery of the Poles is still unrevealed, Nansen has at least made his astonishing journey from shore to shore of ice-capped Greenland. In the interior of Asia, the "Eternal Sanctuary," where dwells the divine Dalai-Lama, has since Huc's visit been closed to profane Europeans; nevertheless, every year sees the circle of itineraries narrowed round about the sacred spot.

In the "Dark Continent," the problems of the Nile, of the Zambesi, Congo, and Niger have all been solved. Everywhere the network of travels covers the planet with its ever-contracting meshes. A systematic exploration has even been begun of the underground world, of the caves and katabothras of Greece, the subterranean pits and channels of Vaucluse and the Causses. The chart of the marine depths, with their temperatures, living organisms, and geological deposits, is progressing, like that of the continents, towards completion. As knowledge increases, man, so to say, becomes daily transformed to a new life.

At the same time distant lands are constantly drawn closer together. The Atlantic, a broad expanse for Norse Vikings and Genoese mariners, has become, in the language of modern seafarers, a mere "ditch" traversed in a hundred hours. Every year diminishes the time taken to make the tour of the world, which for certain "globe-trotters" has become a caprice of the moment. So bounded are now the confines of the planet, that it everywhere benefits by the same industrial appliances; that, thanks to a continuous network of postal and telegraphic services, it has been enriched by a nervous system for the interchange of thought; that it demands a common meridian and a common hour, while on all sides appear the inventors of a universal language. Despite the rancours fostered by war, despite hereditary hatreds, all mankind is becoming one. Whether our origin be one or manifold, this unity grows apace, daily assumes more of a quickening reality.

In the presence of this world, which is modified from day to day, and whose changes I can follow only from a distance, I have nevertheless endeavoured clearly to realise the lands described, as if I had them actually under my very eyes, and to study their inhabitants as if I had mingled in their society. I have striven to live my pictures, revealing the characteristic features of each region, portraying the peculiar genius of each human group. Everywhere, I may say, I have felt at home, in my native land, amid my brother men. I am not conscious of having

been swayed by any sentiment other than one of sympathy and respect for all the inhabitants of the universal fatherland. On this ball, that spins so swiftly in space, a grain of sand in infinitude, is it worth while to cherish mutual hatreds?

But while taking my place at this standpoint of human solidarity, my work seems still unfinished. Before studying in detail the planetary surface and the peoples inhabiting it, I had tried in another work, *The Earth*,* to study the life-history of the globe itself, such as it is presented isolatedly, prepared to receive the humanity by which the great body is animated. That work was a sort of introduction to the series of volumes which I now bring to a close. But is not a conclusion still lacking?

Man, like the Earth, has his laws.

Seen from above and from afar, the diversity of features intermingled on the surface of the globe—crests and valleys, meandering waters, shore-lines, heights and depths, superimposed rocks—presents an image which, so far from being chaotic, reveals to him who understands a marvellous picture of harmony and beauty. The man who searchingly surveys this universe, assists at the vast work of incessant creation, always beginning, never ending, and himself sharing by the largeness of his grasp in the eternity of things, he may, like Newton, like Darwin, find the word that sums all up.

And if the earth seems consistent and simple amid the endless complexity of its forms, shall the indwelling humanity, as is often said, be nought but a blind chaotic mass, heaving at hazard, aimless, without an attainable ideal, unconscious of its very destiny? Migrations in diverse directions, settlements and dispersions, growth and decline of nations, civilisations and decadence, formation and displacement of vital centres; are all these, as might seem at the first glance, mere facts, nay, facts unconnected in time, facts whose endless play is uncontrolled by any rhythmical movement giving them a general tendency, which may be expressed by a law? This it is that it concerns us to know. Is the evolution of man in perfect harmony with the laws of the Earth? How is he modified under the thousand influences of the modifying environment? Are the vibrations simultaneous, and do they incessantly modulate their tones from age to age?

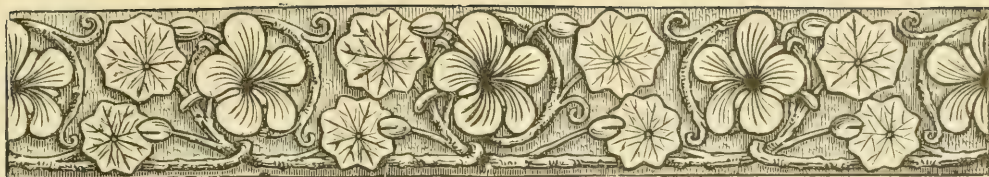
* *The Earth*: A Descriptive History of the Physical Phenomena of the Life of our Globe. By Elisée Reclus.

Possibly the little already known may enable us to see farther into the darkness of the future, and to assist at events which are not yet. Possibly we may succeed in contemplating in thought the spectacle of human history beyond the evil days of strife and ignorance, and there again behold the picture of grandeur and beauty already unfolded by the earth.

Here is what I would fain study according to the measure of my strength. From the myriad facts which I have had to record from chapter to chapter I would fain extract a general idea, and thus, in a small volume written at leisure, justify the long series of books now ended without apparent conclusion.

ELISÉE RECLUS.





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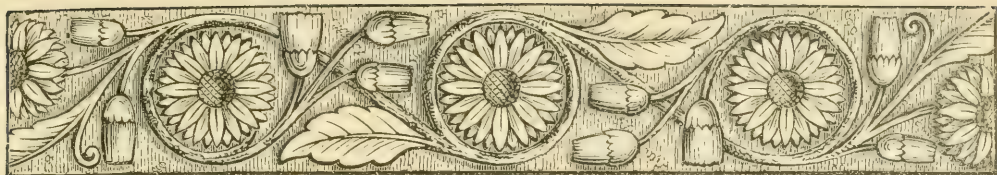
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THE EARTH AND ITS INHABITANTS.

AMAZONIA AND LA PLATA.

CHAPTER I.

THE GUIANAS.

GENERAL SURVEY.



DURING the last three centuries the term Guiana, as a geographical expression, has been diversely modified. When the first Spanish, English, and Dutch navigators visited the banks of the Orinoco they found them occupied by the Guayano, Guayana, or Guayanaze Indians, whose name came to be applied in a vague way to the whole region roamed by them south of the great river. This extension of its meaning was all the more natural that the word was already current in various forms, not only as a tribal designation, but also as the name of several rivers in different parts of the Continent.

Thus the Guaraunos (Warauns) of the Orinoco delta would appear to be simply Guayanos; the Rucuyennes farther east also called themselves Wayana, and gave the same name to a great tree, mythical protector of the tribe. Lastly the Upper Rio Negro, in its higher reaches below the Andean foothills, bears the name of Guainia, a native term identical with Guiana, as is also Waini or Guainia, the name of one of the coast streams between the Essequibo and the Orinoco delta.

But the name Guiana, as first employed by Europeans, did not include the Atlantic coastlands, which are at present more particularly designated by that name. It was, in fact, restricted to the region now known as Venezuelan Guiana, and was thus limited by the vast semi-circular bend of the Upper Orinoco. But in geographical terminology it gradually acquired a wider application, being at first extended to the Brazilian lands bounded southwards by the Rio Negro and the

Amazons, and then to the eastern slopes of the mountains, formerly known, in a general way, as the Serra de Parima, and figuring on the early maps as Caribana, that is to say, "Land of the Caribs."

EXTENT—NATURAL DIVISIONS.

Within these wider limits Guiana constitutes a well-defined section of the South American mainland. It comprises the whole of the oval space, some 800,000 square miles in extent, which is cut off from the rest of the Continent by the valleys of the Orinoco, Cassiquiare, Rio Negro, and Lower Amazons. This vast region of South America has been called an "island," but there is no question here of a real island completely encircled by a navigable waterway. Although it may probably one day assume this character, by means of a series of artificial canals, the navigation is at present interrupted by the famous Aitues and Maipures rapids on the Orinoco, as well as by others on the Cassiquiare and on the Upper Rio Negro, where boatmen have to land their goods and surmount the obstructions by portages. Thus, even under the most favourable conditions of weather, currents, and conveyance, the circumnavigation of Guiana could not at present be completed under three or four months.

From the geological standpoint also, Guiana constitutes an isolated region distinct from the rest of the mainland. It consists of a separate mass of granites and other eruptive rocks, which have been upheaved since the Triassic epoch.

The whole system, however, presents considerable diversity, and may be decomposed into four nearly equal natural divisions by two lines intersecting each other at right angles. The first is formed by the crests of the mountains which are disposed nearly parallel with the equator, running from the low water-parting near the Cassiquiare towards the northern headland of the Amazons estuary. The second is somewhat less distinctly indicated by the transverse depression traversed in one direction by the Essequibo, in the other by the Rio Branco.

POLITICAL DIVISIONS.

But the rival conquering Powers in the American continent could scarcely be expected to pay much attention to this natural segmentation of the Guianas, more especially as the European settlers had easy access only to the coastlands and the banks of the great rivers. Even within a few miles of the sea the interior of the country long remained absolutely unknown. Adventurers made their way into the recesses of the forests and savannas, but they brought back no clear geographical details, and of the mountainous central regions nothing was known beyond vague or fabulous reports. As in so many other parts of the southern continent, rumour spoke here also of the *El Dorado*, who was supposed to bathe in liquid gold, and who dwelt in an emerald and ruby palace. Frequent attempts were made to discover this "man of gold" and plunder his treasures. But no systematic exploration was undertaken before the present century.

Thus it happened that the political divisions were made, not along the lines of natural separation, but were developed from the seaboard towards the interior. Spain, whose domain is inherited by the republic of Venezuela, took possession of

the whole of northern and western Guiana, along the crescent described by the Orinoco. Portugal, now replaced by Brazil, appropriated that section of the Guianas which lies on the Amazonian slope. Thus for the other European Powers nothing remained except the maritime region comprised between the Orinoco delta and the estuary of the Amazons.

Here the English, Dutch, and French secured a footing as conquerors and colonists. To their settlements on the seaboard they added the "hinterlands" of all the coast streams traversing their several domains, claiming the whole region between the sea and the unknown watersheds of those rivers. The three colonial

Fig. 1.—ISLAND OF THE GUIANAS.

Scale 1 : 20,000,000.



domains thus constituted form the territory now specially known as Guiana, properly so called.

The frontiers of these colonies, however, are still fluctuating. Towards the south the water-partings have not yet been surveyed in their entire length and in all their intricate details. Numerous expeditions have been undertaken in this direction, but none of them have been commissioned to determine with accuracy the parting lines between the several conterminous territories.

Towards the west and east the question of frontiers assumes a different aspect, and here tracts of considerable extent are still a subject of contention. Great Britain claims a right not only to the whole of the Essequibo basin, but also to a section of the upper Rio Branco, which is disputed by Brazil. In the direction of Venezuela the frontiers of British Guiana have been advanced to the southern margin of one of the chief branches of the Orinoco delta along the channel of

the Amacuru. The boundary has also been drawn so as to include the rich auriferous alluvia of the Cuyuni valley, and the whole of the disputed territory, which has already led to sanguinary conflicts, comprises a superficial area more extensive than that of the region recognised as belonging indisputably to Great Britain.

At the other extremity of the Guianas, France contests with Brazil a large tract estimated at about half the size of France. The district in dispute forms a long strip of the Amazons basin, extending along the Atlantic seaboard between the Araguari and the Rio Branco. All these disputed lands on the south, west, and east frontiers form so many distinct political domains comprised within the natural limits of the "island of Guiana." The whole region thus contains five separate territories, with superficial areas as under:—

	sq. miles.
British Guiana, including the district disputed by Brazil	45,700
Guiana contested by Great Britain and Venezuela	50,000
Dutch Guiana (undisputed)	45,700
French Guiana (undisputed)	31,000
Guiana contested by France and Brazil	100,000
Total according to H. Coudreau	272,400

All these Guianas greatly resemble each other in their general physical aspects, their geographical constitution, the direction and character of their running waters and marine currents, the erosions and deposits of their coastlands, their climatic relations, the distribution of their animal and vegetable species, the affinities of their indigenous populations. To human agencies are mainly due the chief contrasts observed in the different colonial territories, which have been subjected by the respective mother countries to different social and economic conditions. Numerous travellers, some acting on individual impulse, some in their official capacity, have carefully studied many of the river valleys, agricultural and mining districts, and their itineraries have been connected with those of other explorers who have traversed the whole region, either from one slope to the other, or from the banks of the Orinoco to those of the Amazons. Thanks to these collective surveys, a general picture may now be formed of the physical and biological features of the Guianas.

PROGRESS OF DISCOVERY AND SETTLEMENT.

Our first knowledge of the seaboard is due to the Spanish navigator, Vicente Yañez Pinzon, who had accompanied Columbus on his voyage of discovery. In the year 1500 this pioneer, after coasting the shores of Brazil east of the Amazons, crossed the estuary and skirted the low-lying coasts of Guiana as far as the Orinoco delta. He was followed by Diego de Lepe and other mariners, who explored the same waters; but nearly a century passed before any European settlers ventured to penetrate into the interior.

A few Spaniards had already landed on the coasts near the Orinoco, when some Dutchmen attempted in 1581 to establish themselves on the banks of the Demerara and open trade with the natives. Other pioneers were attracted by the love of

adventure and by the hope of discovering the treasures of El Dorado. In 1596 the English explorer, Keymis, following in the footsteps of Sir Walter Raleigh in the "Empire of Guaya," that is, in Spanish Guiana, went in quest of the fictitious lake Manoa, which figures on Raleigh's map as a great sheet of water 200 miles long, with a city at its eastern extremity, reported to be "the largest in the world." This map, for the first time published in 1892,* shows the course of the Orinoco and Amazons rivers, and covers the whole continent from their mouths to the Pacific coast. Writing in 1595 to Lord Charles Howard on "the discovery of the large, rich, and beautiful empire of Guaya," Sir Walter remarks in reference to the map: "How these rivers crosse and encounter, how the country lieth, and is bordered, the passage of Camenes, and of Berreo, mine own discoverie, and the way that I entred, with all the rest of the nations, and rivers, your lordship shall receive in a large chart or map, which I have not yet finished, and which I shall most humbly pray your lordship to secret, and not to suffer it to pass your own hands; for by a draught thereof all may be prevented by other nations. For I know it this very yeere sought by the French, although by the way they now take I fear it not much."

But instead of taking the route of the Orinoco, Keymis ascended the river Oyapok, which traverses the region that has since become French Guiana. In 1688 la Motte Aignon sailed up the same river a distance of "fifty leagues" from the sea, in the vain hope of reaching the banks of the Amazons, and perhaps even of discovering the route leading to the famous region of gold and precious stones.

So late as 1739 the same mirage of a city with houses of rubies and other gems was still powerful enough to attract Nicolas Hortsman, who, following the course of the Essequibo, penetrated far into the interior.

But regular colonisation had its origin not in adventure but in commerce. Once settled on the Guiana seaboard, the traders of various nationalities began to struggle for the ascendancy in the conquered lands, and their respective Governments took part in these rivalries by organising warlike or plundering expeditions. Thanks to these expeditions a better knowledge was gradually acquired of the more favoured districts on the seaboard; the geographical features of the coastlands, estuaries, and watercourses as far as the first rapids, were more accurately laid down, and some vague notions of the inland regions were obtained from the reports of the Indians and of the Bush Negroes.

In 1672 Richter made his famous discovery of the flattening of the globe at its poles. Two years later the Jesuits, Grillet and Béchamel, were sent to Cayenne to study the physical geography of the country; but after penetrating to the territory of the Nurag and Acoqua Indians, these pioneers succumbed to the hardships of the journey. The scientific exploration of the Guianas was thus delayed till the eighteenth century, when a beginning was made in 1743 and 1744 by

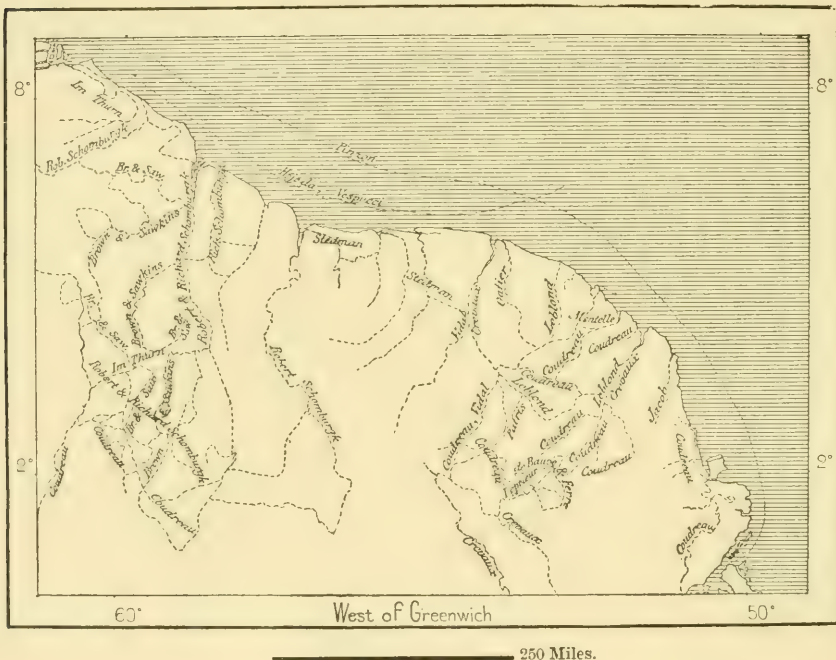
* Sir Walter Raleigh's *Karte von Guyana um 1595*, von L. Friedrichsen. Separatabdruck aus *Festschrift der Hamburgischen Amerika-Feier*, 1892. This is a fac-simile of the original preserved in the British Museum.

Barrère and by La Condamine on his return from his memorable expedition to the equatorial Andes.

Twenty years later Simon Mentelle arrived at Cayenne, where he sojourned under conditions of the greatest difficulty for thirty-six years. During this period he visited, in his capacity as engineer, the whole of the seaboard of French Guiana, and had his advice been attended to, many a disastrous expedition would have been avoided. The same region was traversed in 1762—64 by the botanist, Fusée Aublet, whose work on the *Plants of Guiana* is still a standard book of reference. In 1787 his associate, Patris, ascended the Oyapok and its Camopi affluent, and Leblond, another naturalist of considerable intelligence and enterprise, followed nearly the same route, returning by the river Sinnamari. He spent

Fig. 2.—ROUTES OF THE CHIEF EXPLORERS OF GUIANA.

Scale 1 : 13,000,000.



several years in exploring a great part of the land, studying its economic plants, searching especially for the quinquina, which he failed to find, observing the aborigines, and developing projects for the settlement of the uplands.

Both in French and Dutch Guiana the engineer Guisan constructed numerous navigable and drainage canals, taking advantage of these works to investigate the character of the soil, climate, and local products. Stedman, an English officer in the Dutch service, turned to profitable account a residence of five years (1772-77) in the interior of the colony of Surinam. He has left us a valuable record of his travels and observations in this region, as well as an excellent history of the wars with the Bush Negroes, in which he was actively engaged.

Later the gangs of convicts transported to French Guiana contributed to a

wider knowledge of the country ; for which, however, they earned the evil reputation of a land of pestilence and death. Of all the educated exiles who eventually returned to the mother country, not one was found capable or willing to prepare a work of permanent value on the land of his banishment.

After the wars of the Revolution and of the Empire the first voyages of discovery modelled on the memorable expeditions of Humboldt and Bonpland to the New World were those undertaken by the brothers Schomburgk in the years 1835-39. After investigating nearly the whole of British Guiana, these distinguished travellers crossed the mountains and connected their itineraries with those of Humboldt and other explorers in the Orinoco basin. In French Guiana the divide between the Oyapok, Yari, and Araguari rivers had already been crossed by Adam de Bauve in 1830. Leprieur had traversed the same regions, descending the Yari for a distance of over fifty leagues, while Gatier surveyed the course of the Mana to its sources.

During the twenty years from 1849 to 1868, Appun, friend and associate of the forest Indians, devoted himself to the study more especially of the plants and animals of exuberant tropical nature in British and Venezuelan Guianas ; the geologists Brown and Sawkins continued on the mainland as far as the Pacaraima mountains the researches they had successfully carried out in the neighbouring island of Trinidad ; Idenburg occupied himself with the climatology and sanitary condition of Dutch Guiana ; Crevaux in 1876 and Coudreau in 1883 resumed the work of the Schomburgks at other points nearer to the Amazons, thus connecting the itineraries of the seaboard with those of the inland Brazilian slopes in the Rio Branco and Rio Negro basins.

Since the year 1883 Everard im Thurn has been occupied with careful cartographic surveys of the disputed north-western territory claimed by Great Britain on the Venezuelan frontier. Triangulations are still lacking for accurate maps of that region, but we already possess all the elements needed to lay down with sufficient precision the course of the ramifying streams and the relief of the mountains, bringing the details into harmony with the more scientific surveys of the coastlands and fluvial estuaries.

Of the numerous publications dealing with the geographical literature of the Guianas, their populations, administration, and economic conditions, some are of great value to students of anthropology and political economy. Amongst them are the writings of Kappler and Anthony Trollope, Gifford Palgrave's *Dutch Guiana* (1876), and, above all, Everard im Thurn's classical work on *The Indians of Guiana* (1883).

PHYSICAL FEATURES—RORAIMA.

Between Venezuela and British Guiana the chief mountain mass, forming the natural frontier of both regions, is the superb Roraima, a square block or table of pink sandstone, which discharges from a height of 7,500 feet several cascades blown into ribbons of spray by the breeze. The whole system of mountains, collectively known as the Pacaraima range, presents its loftiest crests to the west and south-west in the Upper Rio Branco basin.

Towards the east, that is, in British Guiana, few of the peaks and terraces exceed 3,000 feet. But despite their moderate elevation these mountains present an imposing aspect, thanks to their sandstone walls rising hundreds of yards vertically above the surrounding plains, their bare white cliffs forming a striking background to the tropical vegetation which clothes the talus accumulated at their base.

Roraima is continued north-eastwards in the direction of the Mazaruni river by other quadrangular masses, which present the appearance of citadels raised by the hand of man. The regular disposition of the upper strata, level as the surface of the marine waters in which they were deposited, recalls the geological epoch when the now deeply eroded face of the land presented the aspect of a vast uniform plain unbroken by a single undulation of the surface.

THE PACARAIMA MOUNTAINS.

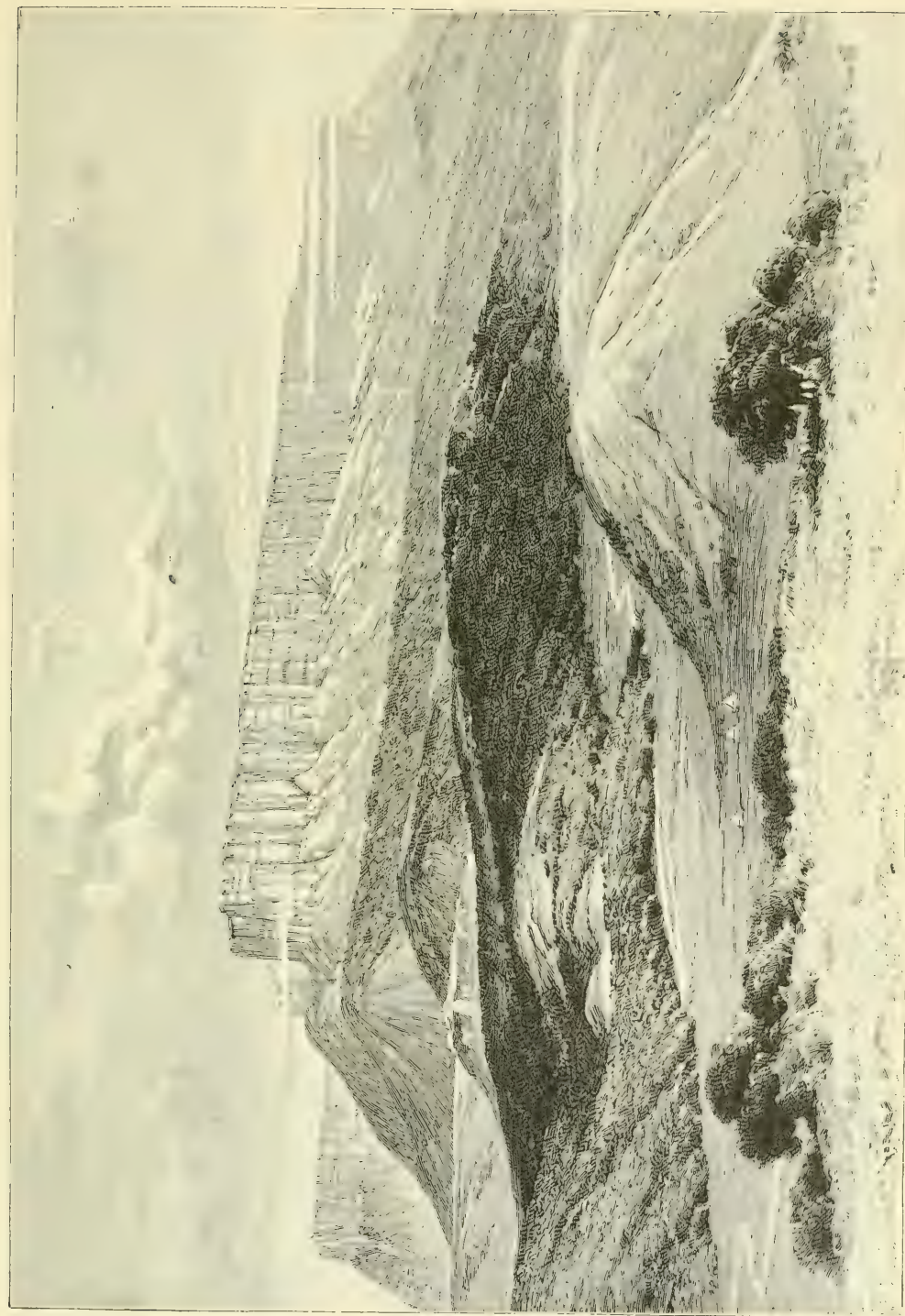
Carved by the running waters into distinct sections, trending for the most part north-west and south-east, the Pacaraima ("Basket") Mountains gradually contract in the direction of the east. Here they terminate on the banks of the Essequibo in a bold diorite bluff resembling a calabash, whence its Indian name, *Camuti*. The unfossiliferous sandstone range is pierced here and there by other diorite masses. In the depths of the surrounding forests is occasionally heard a loud noise like a long peal of thunder, which may probably be caused by portions of the vertical cliffs from time to time giving way and falling with a crash.*

South of these mountains, which are the highest on the Guiana slope of the Atlantic, follow other less elevated masses rising in the middle of the savannas, which appear to have at one time formed the bed of a vast inland sea disposed in a line parallel with the neighbouring oceanic waters. Canucu, Cumucumu, Coratamung, and the other isolated groups, which have a mean altitude of about 2,000 feet, formerly constituted a chain of crystalline schist or gneiss islands disposed in the same direction as the Pacaraima range.

Farther south other ridges of like formation run east and west between the Essequibo and the copious Takutu affluent of the Rio Branco. These eminences rise above alluvial lands, which at some remote epoch were also flooded by lacustrine waters. In several places the parting line between the Atlantic and Amazonian basins is indicated by no perceptible rising ground, and, according to Brown, this low-lying divide has an absolute elevation of not more than 348 or 350 feet. One of its depressions is flooded by the little Lake Amuku, which lies on the zone of separation between the Pirara, a sub-affluent of the Takutu, and the Rupununi tributary of the Essequibo. Hence in this region of savannas the passage from one slope to the other is extremely easy, and has been followed at all times by the Indian tribes in their migrations between the Amazonian and Atlantic watersheds.

The absence of natural frontiers between the Essequibo and Amazons basins

* Charles Barrington Brown, *Canoe and Camp Life in British Guiana*.



MOUNT RORAIMA.

also accounts for the differences that have arisen between the Governments of Great Britain and Brazil regarding the limits of their respective domains about the sources of the Essequibo and Rio Branco affluents. The whole of the dividing zone sometimes takes the name of the River Parira, a word of Macusi origin, which, according to Schomburgk, indicates the geological constitution of the land—a ferruginous conglomerate. Above the water-parting rises a column of trap formation, which is regarded as a sacred object by the surrounding Macusi Indians.

A few other isolated groups follow southwards as far as the neighbourhood of the sources of the Essequibo, which stand at an altitude of about 820 feet. Here the heights, glimpses of which are at rare intervals obtained from the river banks across the dense foliage of the primeval woodlands, do not develop a continuous amphitheatre of rounded hills, but form a number of distinct ridges sharply defined by deep transverse gorges. They constitute so many “huge blocks, some of which have a length of about 90 miles, standing on very low pedestals of plateau formation.”*

According to Coudreau, the loftiest summit in this region is Coïrrit, or Caïrrid Dekeou (Brown's Acaraï), the “Mountain of the Moon,” which lies near the sources of the Takutu, and attains an altitude of about 5,000 feet. It is the culminating peak of a ridge with a mean elevation of some 3,000 feet, which sweeps round in a vast bend first to the south and then to the east, as far as Mount Aourriawa, where rise the headwaters of the Essequibo. Farther on are developed the Curucuri heights, seen from a distance by Coudreau. Here the water-parting coincides exactly with the crest of the mountain range. On one side descend the streams flowing to the Essequibo, on the other those flowing to the Trombetas affluent of the Amazons.

The sierra falls in the direction of the east, where it forms the natural boundary between Dutch Guiana and Brazil. According to Brown, the highest summits rise scarcely 300 feet above the sources of the River Corentyne, which forms the frontier line between Dutch and British Guiana.

THE TUMUC-HUMAC RANGE.

Farther on the system again rises, and here takes the name of the Tumuc-Humac range, a term of unknown meaning. From its northern slopes descends the Maroni, the chief watercourse of French Guiana. According to Coudreau, its highest summit is Mount Timotakem (2,624 feet), which lies in the western section of the range. Few of the travellers that have visited this mountainous region have laid down accurate itineraries of their routes, and hitherto (1894) Coudreau is the only explorer who has mapped the main range with any approach to accuracy. It is all the more difficult to determine its exact form and trend that all the slopes, as well as the intermediate valleys, are clothed with a continuous mantle of dense woodlands.

None of the Tumuc-Humac crests are lofty enough to rise above the zone of

* Henri A. Coudreau, *la France Équinoxiale*.

At their eastern extremity the Tumuc-Humac mountains ramify like the ribs of a fan towards the north-east, the east and south-east, but retain the aspect of distinct ridges only above the low-lying marshy tracts. About the sources of the Oyapok between these ridges the water-partings are so indistinct that the channels of the Oyapok, Cachipour, Araguari, and even of the Yari affluent of the Amazons, are all connected during the rainy season by continuous chains of meres and lagoons. These shallow expanses, however, are unnavigable and inaccessible even to the canoes of the surrounding Indian tribes.

In that section of the Guianas which is comprised between the southern uplands and the seacoast, there nowhere occur any heights forming continuous chains of mountains or hills. Here all the rising grounds are broken by the fluvial valleys into separate ridges of short length, such as the so-called "Montagne Française" on the right bank of the Maroni; the Magnetic Mountain (715 feet) towards the south-east between the Inini and Mana rivers; and the granitic Mount Leblond (1,335 feet), towards the sources of the Sinnamari.

Near the shore the eminences are for the most part merely isolated masses of gneiss, schists, or sandstone ranging in height from 300 to 720 feet. Formerly washed by the marine waves, they are now surrounded by alluvial matter deposited in the marine waters. One line of beach after another was here laid down, enclosing the old islands and archipelagoes, which are now to be sought in the interior of the Continent.

In French Guiana nothing is seen along the seaboard except a few rocky prominences on the beach or in the vicinity of the coast. North-west of Cayenne a few bluffs stand out near Mana, Iracoubo, Sinnamari, and Kourou. South-east of the capital stretch the hills of Caux, whose French name, as spelt in the eighteenth century, has been altered to the English form Kaw. This range of coast hills culminates in Mount Matouri (836 feet), in the "Tour de l'Île," south of Cayenne. Mount Argent, serving as a landmark to mariners at the mouth of the Oyapok, is a mere hillock scarcely 300 feet high.

The district known as the "island of Cayenne," though separated from the mainland only by a few marshy channels, is also studded with knolls representing former islands now connected by sedimentary deposits. Such are Cabassou dominating the capital, and farther east the Remire "Mountains," which were formerly called volcanoes. The neighbouring depressions where rise the springs which supply Cayenne with water were similarly regarded as old "craters."

Along the coast occur a few rocky islets, of which the most important, thanks to its deep anchorage, is the Salut Archipelago; farther east are the *Enfant Perdu*; the *Malingre*, *Père*, *Mère* and *Mamelles*, all disposed in a chain parallel with the shore; lastly, farther seaward, the two *Connétables* facing the mouth of the *Approuague*, upheaved peaks of a submarine plateau.

RIVERS OF GUIANA—THE ESSEQUIBO BASIN.

The Essequibo (Essequebo), largest of all the Guiana rivers, flows entirely in British territory; but the Cuyuni, one of its chief affluents, takes its rise beyond

the Venezuelan frontier. The main stream, like all the other watercourses of this region, appears to bear a native name, in which the final syllable *bo* indicates direction in the Galibi group of languages; hence Essequi-bo would have the sense of "Essequi-wards," in the direction of the Essequi. Nevertheless, Schomburgk refers to a legend which attributes the origin of this name to Don Juan Essequibel or Jaizquibel, one of Diego Columbus's companions.* Formerly the different sections of this great watercourse bore different native names. In the coast region, where it develops a broad estuary, the surrounding populations called it the Aranauma, while the main branch was designated Chip Wa, that is, Chip River, by the Wapisianas and the neighbouring tribes. It would appear to communicate with the upper Trombetas, an Amazonian affluent, through the Apini, a river which, like the Cassiquiare, is said to have a double incline.

Rising in the Awarriwa mountain, the Essequibo, which has a somewhat shorter course than that figured on the English maps of Schomburgk and Brown, flows first north-eastwards through the forest inhabited by a few groups of the Chiriu and Taruma Indians. Farther on it is joined by the Yaore, which flows in a winding course eastwards through the uninhabited wilderness bordering on the savannas. A human figure carved on the face of the rock near a cascade on the Yaore is said by the Indian boatmen to be a portrait of Schomburgk sculptured by the explorer himself, whose name has remained famous amongst the natives; but the effigy is too rudely drawn to accept this legend.

Below the Yaore confluence the Essequibo bends gradually round to the north. Here its bed is still in process of formation; the stream, interrupted by numerous rocky barriers, descends from reach to reach through a succession of cataracts. One of these, bearing the loyal but somewhat eccentric name of "King William the Fourth's Fall," long marked the limit of legitimate trading operations on the upper course of the Essequibo. None ventured beyond this point except the kidnappers who went to capture slaves for the planters of the coastlands.

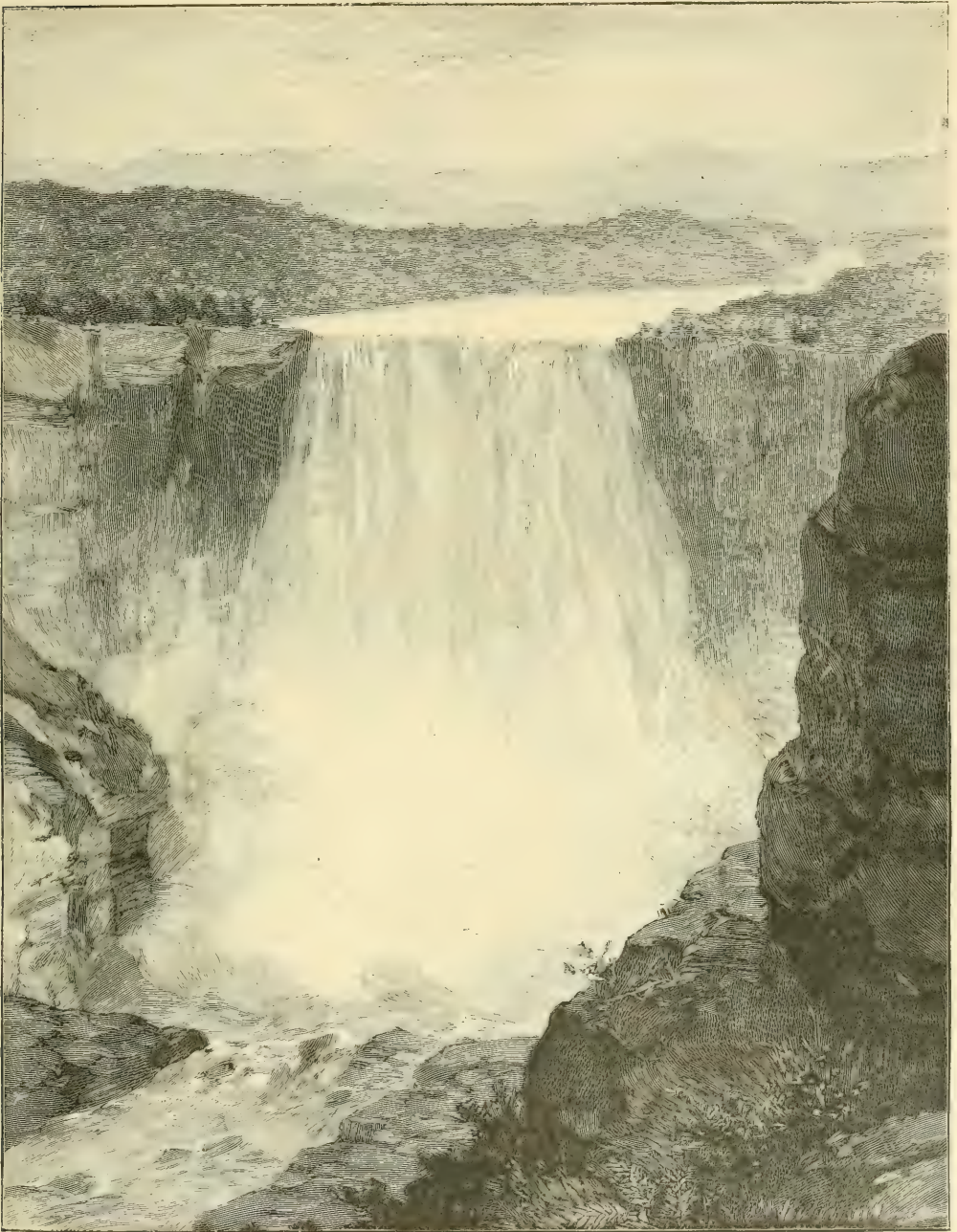
Numerous affluents follow along the left bank of the Essequibo, whose basin broadens out towards the west and contracts to very narrow limits towards the east, from which direction it consequently receives only a few slight contributions. The Cuyuwini, which collects the surface waters of the western savannas, is succeeded lower down by the Rupunini, which is itself joined on its right bank by the copious river Rewa some miles above the confluence with the main stream. The whitish current of this affluent, which mingles with the black water of the Essequibo, offers a navigable route towards the west utilised by the native boatmen to reach the Amazons basin through Lake Amuku and the Pirara river. The only interruption to the waterway between the two systems is a single portage, which is reduced to about half a mile in length during the rainy season.

During this period the flood waters overflow in both directions, on one side to the Rupunini, on the other to the slope drained by the headstreams of the Rio Branco. A great part of this district about the divide between the Essequibo and Amazons basins is occupied by savannas, which would appear to have formerly

* Robert A. Schomburgk, *Description of British Guiana*. Hakluyt calls the river *Dessekebe*.

been the bed of an extensive lacustrine depression, probably the great inland sea celebrated in legend as the Lake Parima where dwelt the "Man of Gold." A

Fig. 4.—KAIETEUR FALLS.



tradition still survives amongst the natives that the bed of the little Lake Amuku, scarcely more than a flooded mere, is "entirely lined with gold."*

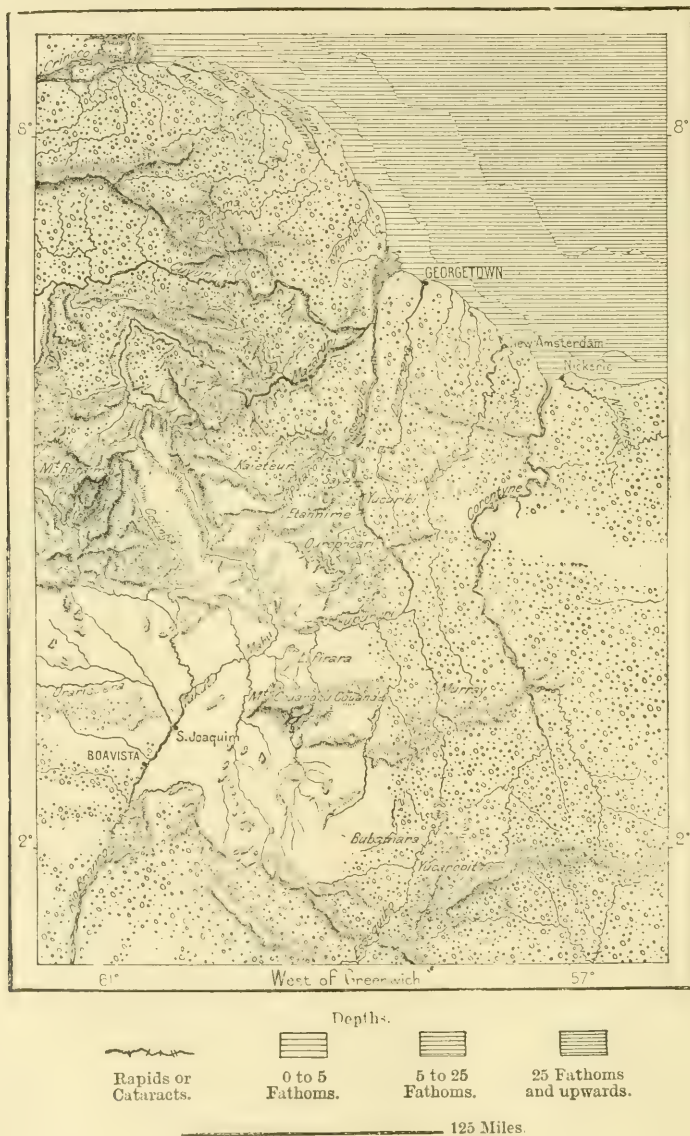
* Gustavo da Suckow, *Geographical Journal*, March, 1893.

THE POTARO AND THE KAIETEUR FALLS.

Lower down the Essequibo is joined by the Burroburro and Potaro rivers, both flowing from the foothills of the Pacaraima uplands, and in their descent tumbling over numerous cascades and rapids. The Kaieteur Falls, formed by the waters of

Fig. 5.—ESSEQUIBO AND UPPER RIO BRANCO BASINS.

Scale 1 : 7,000,000.



the Potaro about the middle of its course, are amongst the finest in Guiana and even in the whole world. Yet their very existence was absolutely unknown to Europeans till the year 1871, when they were discovered by Mr. C. Barrington Brown, at that time engaged on a geological survey of the British Colony. Here

the Potaro is precipitated over an abrupt cliff 741 feet high, and at flood water the fall is 370 feet wide, decreasing at low water to rather less than half that width. During the rainy season Mr. im Thurn compares the spectacle to a vast curtain of water nearly 400 feet wide rolling over the top of the cliff, and retaining its full width until it crashes into the boiling water of the pool which fills the whole space below; but of the pool itself only the outer margin is visible, the greater part being ceaselessly tossed and hurled up in a great and high mass of surf, foam, and spray. The floor of the amphitheatre over which the Potaro tumbles "is occupied by a waste of fallen rocks, made black by constant moisture, but capped with short, intensely green grass, except round the dark stormy pool, where the rocks are entirely bare, slippery, and black. Immediately behind the fall a huge dark cave is visible in the cliff, the upper edge of the cliff serving as a horizon to the whole scene when viewed from below." *

Lower down the Potaro continues still to descend as from step to step through a series of romantic cascades. Formerly the great fall, at that time over 1,000 feet high, stood some 15 miles farther down; but by incessantly eating away the sandstone plateau over which it is hurled down to the plain, it has gradually retreated while diminishing in height. The cornice of rocks from which the river is precipitated consists of a hard conglomerate overlying a more friable sandstone. This sandstone is incessantly eroded by the scething waters of the pool, detaching huge blocks from time to time, and excavating a dark recess beneath the overhanging edge of the plateau. At sunset myriads of swallows, gathering from the surrounding woodlands, sweep the precipice, dart like a flash into the misty spray, and then reappear at the mouth of the cave. Such is the rapidity of their flight that "their wings produce a hissing noise, which is not the least curious phenomenon of this wonderful place. After descending straight down they settle for the night on the face of the cliff, by and behind the fall." †

THE MAZARUNI AND LOWER ESSEQUIBO.

Below the Potaro affluent the Essequibo is almost doubled in volume by the contributions of the Mazaruni, which is itself joined by the Cuyuni eight miles above their common mouth on the left bank of the mainstream. Rising on the highest slopes of the Pacaraima Mountains, where it receives the streams tumbling from Roraima, the Mazaruni is of all the Guiana rivers the most obstructed by cataracts. The falls and rapids occur especially in the lower part of its course, so that, despite its great volume, this river is almost entirely closed to navigation.

At the falls of Chichi, that is, the "Sun," in the Macusi language, the fluvial bed descends a total height of 890 feet (1,380 to 490) in a space of about eight miles. The last obstructions occur at the so-called "Monkey Jump," some 15 miles above the point where the Mazaruni is joined by the Cuyuni.

Below the confluence of the Mazaruni, the Essequibo expands into a broad estuary, which attains a width of no less than 15 miles where it enters the sea.

* *Among the Indians of Guiana*, p. 66.

† *Ib.*

But this great expanse is broken and divided into three main navigable branches by a number of islands, whose long axes are disposed in the same direction as the tidal currents.

The enormous volume of water which is discharged by the Essequibo, and which makes itself felt at a distance of some twelve miles seawards, is explained by the great extent of its catchment basin, combined with an abundant rainfall and the impermeable character of the soil. During the winter season the upper reaches, dammed up by their rocky barriers, overflow their banks in many places, thus periodically restoring the chain of lakes which at one time existed in the fluvial valley.

THE DEMERARA, BERBICE, AND CORENTYNE.

The Demerara (Demerari), formerly Lemdrare, flows east of and parallel to the Essequibo with such regularity that it might almost be taken for a lateral channel, into which were formerly discharged the flood waters of some stream rivalling the Amazons itself in magnitude. Rising amid the northern spurs of the dividing range, the Demerara traverses the same geological formations as the Essequibo, first granite masses, then sandstones with diorites cropping out at various points, and towards the coast broad alluvial tracts strewn here and there with sandhills from 50 to 60 feet high. Sluggish channels and backwaters ramify eastwards, connecting the Demerara with the Mahaica, a river of similar aspect, but of much smaller volume.

The Berbice and the Corentyne (Corentijn), which follow in the direction of the east, also flow in parallel courses quite as regular as those of the Essequibo and Demerara. They develop the same curves and have to surmount the same obstructions by cascades tumbling over rocky granite, diorite, or sandstone barriers. But they vary considerably in length, the Berbice rising far in advance of the dividing range, whereas the Corentyne has its source in the Curucuri mountains away to the south. The latter is already a copious stream at the point where it pierces the rocky hills, in which its western neighbour the Berbice takes its rise.

In this district the Corentyne is joined on its left bank by the New River, through a labyrinth of ramifying branches, and below the confluence the united waters descend to the plains through a series of superb falls and rapids. To one of these, Robert Schomburgk gave the name of King Frederick William the Fourth, as to the corresponding cataract of the Essequibo, which lies under the same latitude, and which presents the same general aspect amid its rugged granite walls.

The Corentyne develops another grand fall at the crystalline rocks of Wonotobo, where three or four branches ramifying into several channels are precipitated from a height of about 100 feet into a lake about a mile wide, from which it issues in a single stream about 1,000 feet broad and 80 feet deep. Beyond this point the Corentyne is entirely free from rapids for the rest of its course of some 170 miles to the sea. But its broad estuary, studded with islands, reefs, and shoals, is of difficult access, and practically closed to vessels drawing more than 10 feet of water.

THE COAST STREAMS OF DUTCH GUIANA.

This estuary also receives the discharge of the River Nickerie from the east. The Nickerie may be taken as a type of the coast streams of Dutch Guiana, developing an irregular but continuous current, which winds sluggishly from east to west through the low-lying alluvial plains. Some of the rivers rising farther inland on the advanced terraces of the dividing range are intercepted on their course to the Atlantic by these coast streams, whose volume they swell, while deflecting them to the east or to the west, according to the abundance of their discharge or the incline of the land. Thus the Upper Nickerie and the Coppename after joining the coast stream continue their seaward course in opposite directions, while between the two winds a channel whose current sets alternately to the right or to the left according to the strength of the river descending from the interior.

East of the Coppename follow the Coesewijne and the Saramacca, which do not communicate directly with the Coppename or its ramifying creeks, although they fall into the same estuary. The lower course of the Saramacca, flowing from east to west, cuts off a strip of coastland, partly bush and partly swamp, which has been completely isolated in the direction of the east as far as the Surinam estuary by an old creek canalised in the seventeenth century by the famous Governor Sommeldyke, and still known as the Sommeldyke Canal.

East of the Surinam, whose bar is accessible at ebb tide to vessels drawing 16 feet of water, the bush and marshy coastlands present towards the sea a long low-lying beach of scarcely perceptible curve, and towards the interior an intricate system of tortuous rivers and creeks with alternating currents. Here and there these watercourses have been transformed to regular navigable canals, largely utilised by the boats and canoes of planters and natives. Thus follow from west to east between the Surinam and the Maroni on the French frontier, the Comme-wijne, Cottica, Coermoeribo (Cormontibo), and the Wana or Wane Creek.

The tendency of all the watercourses in this part of Guiana to set in a direction parallel with the coast, as well as the deposit of rich alluvial matter between the watercourses themselves and the present shore-line, cannot be explained merely by the action of the periodical floods. On the contrary, the ocean plays the chief part in the production of these phenomena. The liquid masses rolled down by the Amazons and the Tocantins do not precipitate all their sediment in the great "fresh-water" estuary. Being intercepted by the marine current, the fluvial waters are deflected along the shores of the Guianas as far as the Orinoco, beyond which a portion penetrates through the Serpent's Mouth into the Gulf of Paria.

Thus the alluvial matter brought down by the great Brazilian rivers is distributed along the Guiana seaboard, and in this way beach after beach is successively added to the continental periphery. Most of these new formations become merged in a continuous low-lying coastland, but their regular successive growth is still shown by the intermediate creeks disposed parallel with the shore-line. The fluvial waters of the interior, arrested by the opposing marine current,

are ceaselessly deflected westwards, so as to flow parallel with the ocean stream itself. The alluvial tracts of peninsular formation are thus extended to great distances between the coast streams and the sea, until some weak point here and there suddenly yields to the action of some fierce storm or of an exceptionally high inundation.

In this way has been formed the whole coast system of Dutch Guiana, with its perfectly distinct double shore-line, that may be traced all the way from the Corentyne to the Maroni. These tracts of oceanic origin are still more clearly indicated in that district of British Guiana which lies immediately to the east of the Orinoco delta, and the possession of which is contested by Venezuela. Here the Pomerun river, which reaches the sea at Cape Nassau, the Waini (Guainia), the Barima, and the Amacuru all intersect so many strips of the seaboard that have been built up by the deposition of sedimentary matter in the shallow waters beyond the primitive continental contour-line.

Palgrave, a careful observer of the hydrographic system of Dutch Guiana, describes the rivers of that region as its true highways, "traced right and left with matchless profusion by Nature herself. Broad and deep, tidal too for miles up their course, but with scarcely any variation in the fulness of their mighty flow, summer or winter, rainy season or dry, so constant is the water supply from its common origin, the equatorial mountain chain. They give easy access to the innermost recesses of the vast regions beyond, east, west, and south; and where their tortuous windings and multiplied side canals fail to reach, Batavian industry and skill have made good the want by canals, straighter in course, and often hardly inferior in navigable capacity to the mother rivers themselves. On the skeleton plain, so to speak, of this mighty system of water communication, the entire cultivation of the interior has been naturally adjusted; and the estates of Surinam are ranged one after another along the margin of rivers and canals, just as farms might be along highways and byeways in Germany or Hungary. Subservient to the waterways, narrow land-paths follow the river or trench, by which not every estate alone, but every sub-division of an estate, every acre almost is defined and bordered, while the smaller dykes and canals are again crossed by wooden bridges, maintained in careful repair; but paths and bridges alike are of a width and solidity adapted to footmen only, or at best to horsemen. The proper carriage road is the river or canal."*

THE MARONI, AWA, AND OYAPOK.

The Maroni, the Marowijn of the Dutch, takes the foremost position amongst the secondary watercourses of the Guianas between the Orinoco and the Amazons. Its ramifying headstreams cover a space of nearly 200 miles, on the northern slope of the Tumuc-Humac Mountains, between the Corentyne and Oyapok basins west and east. At present the larger portion of this drainage area belongs to Holland, the whole of the tract lying between the two main branches of the Awa (Lawa) and the Tapanahoni having been attributed to Dutch Guiana by the

* *Dutch Guiana*, p. 71-2.

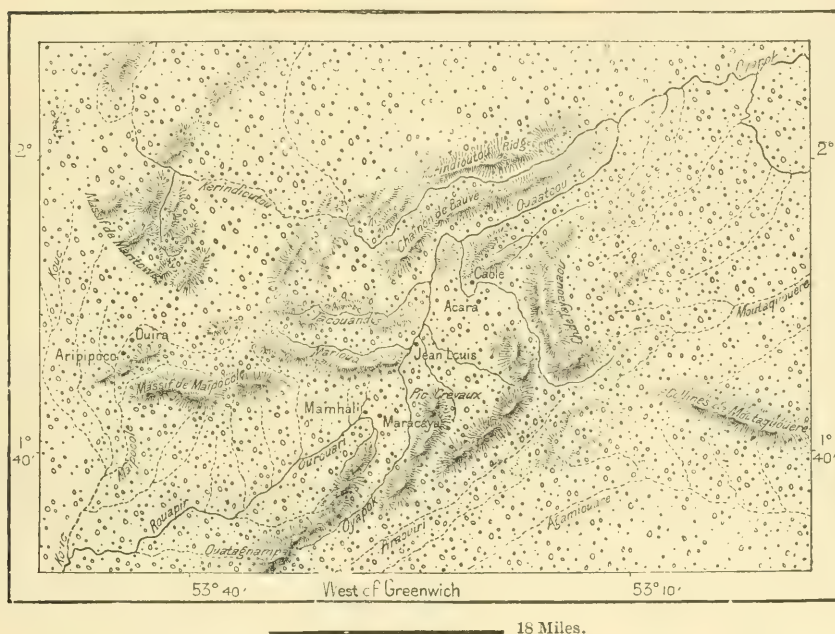
decision of the Tsar, to whom the question in dispute had been referred in 1891.

The Awa or eastern branch, which now serves as the boundary between the conterminous colonies, is supposed to be the more copious of the two headstreams, although the Tapanahoni has the greater winter discharge. Both Crevaux and Coudreau were able to ascend the Awa in boats for a distance of over 300 miles. It has still a width of 60 or 70 feet at the farthest point reached by Coudreau on the Itani, that is, the branch which serves as the international frontier, and whose junction with the Marouini farther east forms the Awa. Immediately beyond this point begin the first rising grounds and steep foothills of the Tumuc-Humac range.

Despite its great distance from the Atlantic, the fluvial bed at the confluence

Fig. 6.—SOURCES OF THE OYAPOK.

Scale 1 : 950,000.



of the two forks is only 650 feet above sea-level; hence in its descent through successive terraces to the coast the Maroni is interrupted by no cataracts of great height. The rocky barriers which at intervals dam up the stream, and which form so many reaches with scarcely perceptible current, have been eroded so as to form a series of natural sluices, through which the river descends in sheets of foam, small cascades, or falls of slight elevation.

At the Hermina (Aramina) Falls, 50 miles from the sea, the Maroni descends a total height of 15 or 16 feet, in a distance of about half a mile. Beyond this point its course is free from all obstruction, and accessible to steamers of some size. Here the river flows between two wooded banks, 3,000 to 5,000 feet apart, and at its mouth forms a bar 16 feet deep at low water.

appropriate to the Amazons than to any other South American stream. Like the Maroni, the Oyapok rises under the name of the Souanre in the Tumac-Humac Mountains at the Watagnapa Peak, and serves as the eastern frontier of the undisputed portion of French Guiana towards Brazil.

The "creeks" * or headwaters of the Oyapok approach those of the Maroni, and these two rivers closely resemble each other in their general character. The Oyapok also, which was usually followed by travellers bound for Brazilian Guiana, descends from reach to reach through a succession of falls and rapids, which, however, are both more numerous and higher than those of the Maroni. Coudreau speaks of two which plunge over precipices some 60 or 70 feet high, and the *Trois Sauts* ("Three Leaps") is probably the finest in the whole of French Guiana. The Robinson Fall, last of the series, lies about 50 miles from the sea.

THE ARAGUARI, CACHIPOUR, AND MAPA GRANDE.

East of the long alluvial promontory of Cape Orange, which is formed by the deposits of the Oyapok, the whole of the triangular space comprised between this river and the Araguari belongs to the same zone of drainage. Like the Oyapok, the Araguari, the Cachipour, the Cunani, the Carsevenne, the Mapa Grande (Amapa of the Brazilians), the Frechal, and the Tartarugal all rise amid the marshy foothills of the Tumac-Humac range, whence they diverge in all directions like the ribs of a fan.

The Araguari estuary marks the extreme limit of the Guiana seaboard, beyond which immediately begin the waters and islands of the Amazonian basin.

GENERAL CHARACTER OF THE GUIANA RIVERS.

As in Venezuelan and Brazilian Guianas beyond the dividing range, the rivers of Guiana north of that range differ greatly in the colour of their waters. Some, those especially of the savannas, are cloudy and whitish, while others flowing from the woodlands seem black or blackish, although really transparent. In the Essequibo basin the blackish hue of these forest streams is attributed to the roots and branches of the wallaba tree growing in the water along their banks.

Although most of the Guiana rivers traverse continuous woodlands from the mountains to the sea, they are far less obstructed by snags than many other watercourses of the tropical regions. This is due to the great specific gravity of nearly all the arborescent species growing along the margins of the Guiana rivers. Instead of floating, the trees falling into the water through erosion or storms sink to the bottom and rot on the spot.

But on the narrow and shallow upper reaches, the tangle of branches and lianas is a great impediment to the boatmen, who are often obliged to hew their way through with the axe or knife. Here the fallen timber accumulates in *barrages*, the so-called *takuba* of the Essequibo Indians, and the *barrancas* of the Brazilian refugees in the contested territory. Other obstructions are formed by masses of aquatic plants, like the *sudd* of the White Nile, which often present as effectual a barrier to the canoe-men as the falls and rapids themselves. In most of the watercourses

* In French Guiana the term *crique* ("creek") is generally applied to mountain torrents.

the sandstone, granite, or diorite reefs rising to or above the surface are covered, as with a coating of tar, by a film composed of iron and manganese oxides. As on the Orinoco, the harder the rock the blacker the film, which in rainy weather emits noxious odours.

Below the reefs and rapids the broad deep rivers, discoloured and dammed up by the tidal current, roll down a yellowish water often hidden beneath floating vegetation. In their lower reaches these streams merge in the riverside morasses, lakes, or lagoons, which in French Guiana take the name of *pripis*. In the more settled and better-cultivated districts of the British and Dutch seaboard the direction and discharge of the flood waters have been regulated by dykes and canals. On the plantations sluices are used to arrest the tides, while the percolating waters are discharged at ebb through the so-called *kokers*, or ditches. About the estuaries the fresh water of the Guiana rivers floats on the heavier salt water for a distance of six or eight miles seawards.

THE GUIANA LAKES.

Thanks to the uniform slope of the land, the old lakes which formerly studded the surface of Guiana, and whose contours may often still be traced in those of the savannas, have nearly all been discharged. These ancient lacustrine depressions have been best preserved in the contested Franco-Brazilian territory between the Mapa Grande and Araguari rivers.

This lake-studded district lies back of the low-lying peninsular headland of Cape do Norte and the equally low island of Maraca. Within a comparatively recent epoch the zone of fresh-water lagoons extended much farther north all the way to the Oyapok river, and at that time all these lakes, creeks, and channels presented a continuous waterway, over 200 miles between Amazonia and French Guiana, navigable throughout by boats and barges. According to the officers in command of the French fort of Mapa, which was maintained during the years 1836—41, craft of forty tons were still able to follow this route about the middle of the nineteenth century. The Lago Grande, immediately south of the Mapa Grande river, is now a mere fragment of the large sheet of water encircling the island on which stood the French fort abandoned in 1841, and reoccupied by the Brazilians in 1890.

South and south-east of the peninsular Cape do Norte follow other lakes, one of which, Lake Jac, near the Carapaporis Strait between the mainland and Maraca Island, appears to still preserve the form of a spacious bay, but without shelter, hence exposed to the Atlantic storms, and scarcely any longer navigable by the native boatmen.

The Lago Novo, near the Araguari river at the southern extremity of the lacustrine chain, also resembles a marine inlet, and even affords a retreat to manatees, which here browse on the forests of aquatic plants. But it is also accessible to barges, which find shelter from the Atlantic gales under the lee of the insular groups which form so many transverse breakwaters. Having a depth of from 30 to 40 feet, this basin might easily be transformed to a magnificent

harbour of refuge spacious enough for whole fleets, by deepening the channel a few miles long with which it communicates with the Araguari, and dredging the estuary which has silted up, presenting in some places depths of little over three feet.

The subsidence and entire disappearance of the Guiana lakes is a process which is accomplished very rapidly. The reeds and other plants which wither in summer are deposited in a bed of floating humus in which various vegetable species and even shrubs strike root. These verdant carpets are from time to time rent by the storms and driven to the surrounding margins. Here they are soon again massed together and thickened. Thus the lake becomes gradually filled in, or transformed to a floating quagmire, firm on the surface, boggy in the lower depths. In a short time nothing remains of the lagoon except the navigable channel, the *igarapé*, or "canoe track." Coudreau even hazards the theory that the lakes are emptied by a kind of see-saw movement of the banks.*

In several of the lacustrine beds have been found huge trunks, whose origin it is difficult to explain, except on the supposition that the lakes were at first dry land, which afterwards subsided through some sudden disturbance of the ground. Another explanation of the phenomenon, however, is suggested by the form and trend of the seaboard. The alluvial promontories at the Oyapok, Approuague, and Cachipour estuaries are all disposed in the direction of the north, and in their lower course these rivers also follow the same direction, evidently under the influence of the marine current, which deposits its sedimentary matter along the shore. It may therefore be assumed that at contact with this current the Araguari was also deflected northwards, and that the chain of lakes which have the same trend are the remains of the old fluvial bed.

The Carapaporis Strait, which flows between Maraca Island and the mainland, and which is clearly distinguished by its greater depth from all the surrounding shallow basins, would on this hypothesis be the old mouth of the Araguari, scarcely modified since the time when the river reached the sea more to the east. If so much be allowed, there would be nothing surprising in the fact that, like the Amazons, the copious Araguari should float down large trees and deposit them along its lower winding course, which afterwards became a system of lagoons connected together by tortuous channels. In the same way the marine current itself intercepts the snags washed down by the Amazons, depositing them along its muddy course, where they afterwards become embedded in the alluvial coastlands of more recent formation. Such ligneous deposits have been found at depths of 78 or 80 feet.

But however this be, great changes have been in progress even during the contemporaneous period. A mere glance at the map suffices to show that the seaboard of the contested Franco-Brazilian territory between the Araguari and the Cachipour presents a striking contrast to the section of the coast running east and west between Cayenne and the Corentyne estuary. This section develops a regular convex curve, indicating the incessant deposit of sediment by the marine

* *La France Équinoxiale, Voyage à travers les Guyanes et l'Amazonie.*

current. But the southern section has, on the contrary, been deeply eroded by the marine waters; a portion of the old shore has been washed away, and the Cape do Norte, as well as Maraca Island, are so many fragments of the ancient continental seaboard. Along the whole length of the coast of Dutch Guiana east and west of Paramaribo, the existence of older beaches may be traced by the lines of snags deposited by the marine current and now embedded in the littoral alluvia.

Analogous contrasts are presented by the character of the coast streams in both regions. Off the shores of Dutch Guiana the soft mud covering the bed of the sea yields like a movable carpet to the action of the Atlantic billows, and thus tends to diminish their force. Thus the rollers gradually subside until the sea becomes quite smooth, so that vessels often find safe anchorage between the marine current and the shore while the storm rages on the high sea.

About the Cape do Norte and Maraca Island, on the contrary, the tides rush in with extreme violence. Nowhere else, not even in the Amazonian estuary, does the *pororoca*, as the bore is locally called, roll up more suddenly, or with a succession of more powerful waves. So far back as 1743 La Condamine had already described the waters about the Araguari estuary as amongst the most dangerous for shipping. The tides, pent up in the narrow gulf on a gradually shoaling bed, rise in a few minutes to one-third of high water level; they have occasionally been observed to rise almost suddenly as many as 20 or even 26 feet. The floods spread far over the low-lying coastlands, and during the spring tides, when there is a rise of from 40 to 50 feet, whole strips of the mangrove-covered beach have been swept away. These verdant islands, drifting with the current, are stranded farther north about the Cachipour and Oyapok estuaries. Even at neap tide the difference between ebb and flow in these waters is still about 10 feet.

Subjoined is a table of the chief Guiana rivers between the Orinoco and the Amazons, with approximate estimates of their length, areas of drainage, discharge, and extent of navigable waters for small steamers:—

	Length in miles.	Area of basin in square miles.	Mean discharge per second in cubic feet.	Length of navigable waterway.
Essequibo	620	64,700	70,000	40
Demerara	175	3,000	7,250	94
Berbice	325	14,000	18,000	165
Corentijn	450	23,000	35,000	70
Surinam	300	14,000	18,000	96
Maroni	390	23,000	39,000	46
Approuague . . .	190	4,000	2,700	38
Oyapok	300	12,000	26,000	46
Cachipour	320?	8,000	14,000	50
Cunani	175?	4,000	7,250	44
Araguari	310?	9,500	14,000	125

At a distance of from 15 to 50 miles off the coast flows the great marine current, which sets from Cape S. Roque towards Trinidad. Its axis extends on an average 134 miles from the mainland, and its total breadth may be estimated at from 230 to 250 miles. It varies in velocity with the winds, at times exceeding 90 or 95 miles a day, while at others, when retarded by the trade

winds, it moves at scarcely more than a mile an hour, and even develops lateral counter-currents and whirlpools. At such times it rises in the harbours along the seaboard like a fluvial current above the weirs.

CLIMATE OF THE GUIANAS.

The Guianas lie entirely within the zone of the north-east trade winds. Nevertheless they are sufficiently near the equator to come within the influence of the prevailing south-easterlies for a part of the year. At Cayenne, which may be taken as the central point of the Guiana seaboard, the normal wind, setting usually from the north-east, blows regularly from the beginning of December, and acquires its greatest force in January and February. At the spring equinox its fury abates a little, and then follows the period of calms interrupted by squalls, while in the month of July the general shifting of the atmospheric currents towards the northern hemisphere is indicated by the steadily increasing south-easterly breezes. Nevertheless, these south-easterlies, or rather east-south-easterlies, do not blow continuously; they prevail usually at night, being replaced during the day by the land breezes. The Guiana seaboard lies entirely beyond the sphere of the cyclonic storms.

The period during which the north-easterly trade winds prevail corresponds to the rainy season, which usually sets in with the normal winds, and lasts till the period of irregular breezes and of the dry south-easterlies. In March the rainfall is least abundant, whence the expression, "March Summer," which is applied in French Guiana to this relatively dry month. But in May the moisture-bearing clouds discharge their contents in cataracts, and these heavy downpours are known as the *Pluies de la Poussinière*, "Pleiades Rains." On the Guiana seaboard the mean rainfall exceeds 100 inches, and in some years the rain-gauges have registered over 160 inches,* while Mr. im Thurn records a downpour of no less than 13 inches in twelve hours.†

But the precipitation varies greatly from year to year, rising at Georgetown, for instance, from a little over 60 inches in 1885 to double that quantity in 1890. During the rainy season the temperature is slightly lower than in summer; but it never varies more than a few degrees from the normal for the whole year, which may be taken at about 80° or 81° Fahr. In the interior, the range between the extremes is slight, thanks to the uniform relief of the land, which presents no great elevations except in the Pacaraima uplands. But the greatest differences are observed in the distribution of moisture. Thus the rain-bearing clouds intercepted by the mountains discharge their contents in torrents on the higher summits, whereas they part with but little of their humidity on the plains, where they meet with no obstacles.

But even here the atmosphere is nearly always charged with a large quantity of aqueous vapour. At dusk the fogs spread like a vast shroud over the woodlands, where they are often pierced by the large trees, whose crests rise above the

* Rainfall of Cayenne in 1874: 168 inches (Maurel and Hardy).

† *Journal of the Colonial Institute*, 1892—93.

dense haze like rocky islets in the midst of the sea. The plains, the headlands, everything is wrapped in this damp covering, with which are intermingled the miasmatic exhalations of the soil. On the Tumuc-Humac Mountains, where in the space of five months Coudreau made over fifteen hundred observations, the atmosphere is less charged with moisture than on the coastlands. "Here the fogs are drier, and the night temperature falls to 16 degrees" (61° Fahr.).*

FLORA OF THE GUIANAS.

To the irregular distribution of the rainfall must be attributed the striking contrasts presented by the flora of the Guianas. There are two distinct botanical zones—the savannas, or *campos*, as the Brazilians call them, and the primeval woodlands. But account must also be taken of various sandy and arid tracts destitute of all vegetable humus, and of other districts, where, despite the moisture, arborescent plants are prevented from springing up by the dense forests of reeds.

The treeless regions extend for the most part below the hills or mountains, whose upper flanks are exposed to constant rains. Thus in British Guiana the upper Takutu basin, sheltered from the moist winds by the eastern offshoots of the Pacaraima range, lies altogether within the zone of savannas. But certain plains in close proximity to the Atlantic coast are completely destitute of forest growths, although in their geographical position and absence of relief they closely resemble other well-wooded plains. Thus in the contested Franco-Brazilian territory the savannas, interrupted only by fringes of trees along the river banks, extend parallel with the Atlantic coast all the way from Cape Orange to the Amazons estuary, and nearly the whole of the lower Araguari valley forms a vast treeless campo.

In British and Dutch Guiana, the savannas form a narrow belt of open ground reaching from the banks of the Demerara to those of the Surinam. The existence of these treeless tracts between the mangrove-covered littoral and the inland forests is due partly to a local disturbance of the moist winds, partly to the nature of the soil, formerly the bed of a lake.

Like the Venezuelan llanos, the savannas of Guiana present the whole series of transitions from a wooded to a grassy surface. In some districts the limits of the different zones are as sharply defined as those of land and sea formed by vertical cliffs. On emerging from the virgin forest with its tangle of lianas and parasites, the wayfarer suddenly finds himself surrounded by a sea of herbaceous growths, where the eye sweeps unhindered over a vast horizon limited in the distance by a sky-line of mountain crests. Elsewhere the woodlands break into an irregular fringe of glades, distribute their trees more openly, and lower their height, scattering clusters of wooded islets round about their verge.

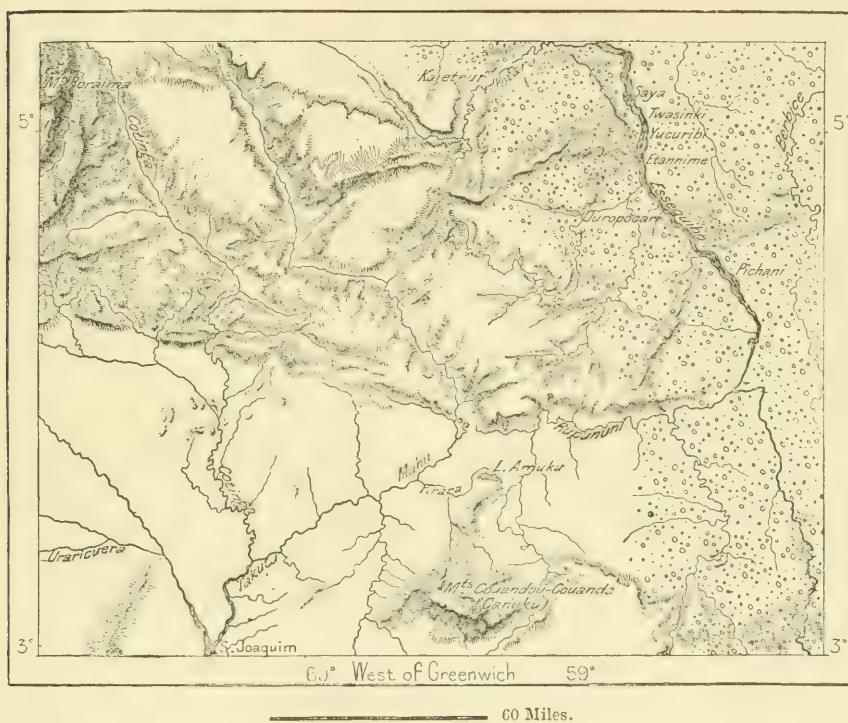
* Meteorological conditions of the Guiana seaboard :—

	Mean Temperature.	Highest Temperature.	Lowest Temperature.	Rainy Days.	Rainfall.
Georgetown . . .	81° F.	90° F.	74° F.	170	119 inches
Paramaribo . . .	79°	86°	70°	177	140 "
Cayenne . . .	80°	92°	72°	160	130 "

The savannas also present analogous differences. Some, especially in the neighbourhood of the dividing range between the British and Brazilian Guianas, are entirely destitute of arborescent vegetation, and these the Brazilians call *campos limpos*, "savannas proper." But in most of the Guiana prairie lands are seen a few trees, either scattered or disposed in rows. Every winding stream has its fringe of forest growths; every brook and gorge has its screen of *Mauritia* palms, regular colonnades, whose capitals are formed of 10 or 12 pendent fan-shaped leaves, the resort of whole flocks of parrots. Where the watercourses ramify into a multitude of channels, the savannas are decomposed into as many secondary prairies with intervening screens of the same palms, or of other trees,

Fig. 8.—TAKUTU SAVANNAS.

Scale 1 : 3,200,000.



resembling the long lines of poplars which border the meadowlands in the Loire valley.

The general aspect and the vegetation of the savannas are modified with the varying quantity of atmosphèric moisture or the greater or less aridity of the soil. In the neighbourhood of the sea and of the coast streams or creeks, the pripris or swampy tracts have somewhat the character of the savannas proper. They dry up in summer when the ground yields a scanty growth of grasses, continuing seawards the surface of the arid inland prairies. In French Guiana most of these swamps take the name of *pinotières*, from the *pinot* palms (*assai* or *euterpe edulis*), which border their margins.

As the ground rises towards the interior, the savannas become clothed with various grasses and leguminous plants analogous to those of the European meadows. Pale green during the rainy season, they assume a russet or a yellowish garb in summer; but they are for the most part destitute of flowering species. They nowhere array themselves in bright colours, nor do they emit the fragrance peculiar to the flowery meads of west Europe. But what they chiefly need is the aid of man in developing a more extensive growth of alimentary plants. From the results of the few agricultural clearings that have been made, especially for fodder crops, some idea may be formed of the natural fertility of these regions.

With few exceptions, the inhabitants contribute little to modify the flora of the savannas beyond the rough-and-ready process of firing the withered grasses in the summer season. The object of these conflagrations is merely to collect a few turtles amid the embers. No attempt is made to improve the pastures, and on the high lands beyond the alluvial tracts, the fires have in many places consumed plants, roots and all, down to the sandy subsoil. A few arid heights, whose underground recesses are the resort of huge lizards, have already here and there assumed somewhat the aspect of sandhills. The fire, under the influence of the winds, is at times propagated with great rapidity, but as a rule it spreads much slower than in the Algerian bush or on the prairies of the Far West in North America. The plants, containing more moisture, are less inflammable, and the conflagration is usually arrested on the verge of the forests after devouring a few of the more exposed trees. Even in the savanna itself it spares the verdant clusters which are formed round about the springs, and which afford cover to the animals during the summer heats.

The Guiana forests, which on the eastern slopes occupy by far the greatest part of the whole region, belong to the Amazonian botanical world. Nearly all the species of the *selva* are represented in the Guiana woodlands, which nevertheless form but a relatively small division of the continent.

Instead of monotonous forests consisting mainly of one or two sociable plants, such as the European or North American pine, spruce, oak, or beech groves, this region possesses a vegetable world characterised by the prodigious variety of its forms. French Guiana alone presents as many as 260 forest species, that is to say, 10 times more than are found in France itself.

The marine current setting from Cape S. Roque along the Brazilian seaboard round to the Guianas certainly contributes its share to the distribution of the southern forms by the seeds, fruits, and branches which it casts up along the seaboard. But all the vegetable treasures of Guiana are still but approximately known, some regions not having yet been visited by any naturalists.

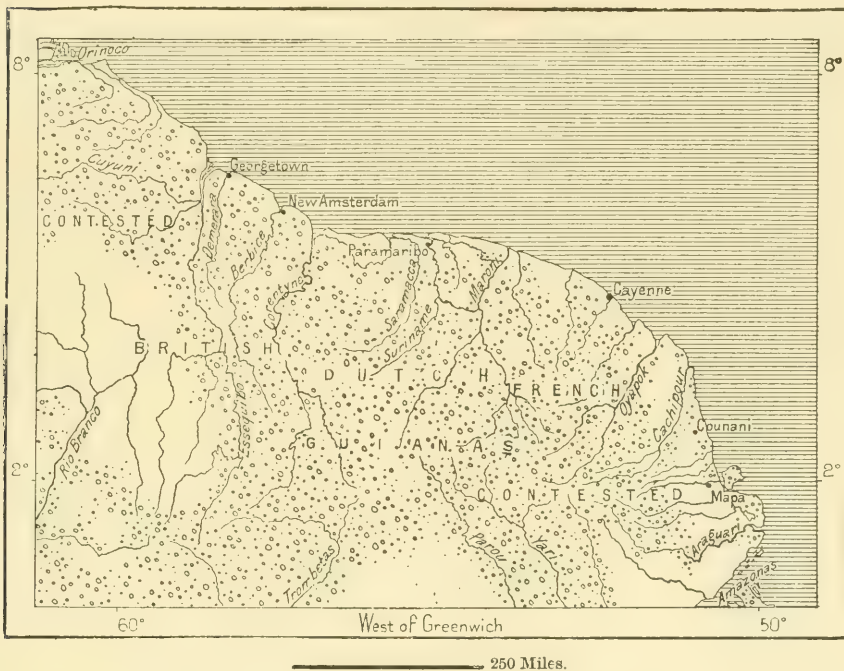
Nevertheless, the itineraries followed by botanists already cover most of the ground. In 1872, Grisebach estimated at 3,500 the number of species described up to that date. The most widespread families are those of the leguminous type, which represent about a ninth part of all the local forms. Next to them the most numerous are the ferns and orchids. The palms, of which as many as 30 varieties occur in French Guiana alone, comprise about the hundredth part of the

whole flora; but their majestic appearance, making them conspicuous objects at a distance, gives them a seeming importance far beyond their mere numbers.

The members of the Venezuelan and Colombian zones, which are not found in Guiana, are mainly the Alpine plants flourishing in the Andes at altitudes much higher than the summits of the Pacaraima and Cairit ranges. At least 200 varieties of tree ferns grow on the slopes at heights of over 3,000 feet; in a few days Richard Schomburgk discovered as many as 93 different members of this family in the Roraima district, which has been called the "Eldorado of botanists." Here the slightest difference of relief, aspect, or soil is marked by fresh forms. The *befaria* (*bejaria*), or "rose of the Andes," and a plant allied to

Fig. 9.—FORESTS AND SAVANNAS OF GUIANA.

Scale 1 : 13,000,000.



the cinchona, are also represented on the slopes of Roraima. On the banks of the Essequibo the Indians make use of arrows obtained from a poisonous bamboo, which produces the same effect as the curare.*

The superb *Victoria regia*, discovered in 1837, in the Berbice River, British Guiana, and afterwards met in many other watercourses in the Amazonian region, is an example of the marvellous beauty that efflorescence may assume in equatorial America. In some places the surface of the lakes almost entirely disappears under a carpet of enormous leaves and tufts of white petals intermingled with other flowers, blue, pink, or yellow, and with quaking grasses. Under certain favourable atmospheric conditions, the flowers of a nymphæacea abounding in these fresh-water basins shine with the calm glow of a night light, much less vivid

* C. B. Brown, *Canoe and Camp Life in British Guiana*.

than that of tropical fire-flies and of other luminous insects, but brighter than that emitted by decaying timber.

Amongst alimentary plants are the wild cacao, several varieties of edible passionworts, wild pine-apples, some sap-yielding palms, the marantaceæ from which arrowroot is extracted, the twelve varieties of manioc, the euphorbiacea from which cassava, coac, and the so-called païourai beverage are prepared, the carambola (*averrhoa c.*), the tuka (*bertholetia excelsa*), whose fruit, resembling a cannon ball, and about the size of a man's head, contains in four cells six or eight of the excellent Brazil or Para nuts.

The "traveller's tree" of Madagascar is represented in the Guianas by the *ravenala guianensis*, a wild plantain with enormous leaves shooting up from near the ground to a height of 10 or even 15 feet. "The bases of the leaf-stalks" sheath the one over the other, and in the pockets formed by each of these sheathing parts much rainwater is retained even through the dry season. Another noticeable feature in these plants is that the seeds within the tough thin shell of the fruit are packed in a large quantity of short fibrous substance like clippings of wool, in the Guiana species of brightest scarlet colour, but in the Madagascar plant of blue.—(*In Thurn.*)

In the coast region are met the oleaginous, medicinal, resinous, and aromatic species of Amazonia, and room might still be found for all those of equatorial Africa. The awara (*attalea speciosa*), a member of the palm family, yields an oil as valuable as that of the Guinea oil-palm, which was introduced into Guiana in 1806. Other kinds, such as the *carapa guyanensis*, whose nuts contain as much as 70 per cent. of their weight in oil, the wax-tree (*virola sabifera*), and the incorruptible wapa (*tamarindus indica*), also offer industrial resources hitherto scarcely utilised; the same may be said of the 150 species and upwards of medicinal plants, all containing valuable properties in their wood, sap, roots, leaves, flowers, or fruits.

Amongst the caoutchoucs and others yielding gums and rubber of the gutta-percha type, noteworthy is the balata (*achras* or *mimusops balata*), the "bullet-tree" of English writers, whose sap is at once elastic and ductile. Like Arabia, Guiana has also its incense tree, the hyawa (*icica heptaphylla*), which is burnt in the churches on the coastlands. "Where the hyawa tree grows, the whole air for some distance round is pleasant and wholesome with the incense-like odour of the white resin that drops from its stem and falls in masses on the ground; and a still more powerfully-scented resin, which coats the trunk of another tree, the tauranero of the Indians (*humirium floribundum*, Mart.), seems to imitate and surpass the odour of vanilla."—(*In Thurn.*)

The natives have brought to the notice of the whites numerous dyewoods, such as the ruçu and the lena (*genipa americana*), and others abounding in tannin. With the fibres of hundreds of plants, from the palm to the pine-apple, they weave a thousand different textile fabrics, which are used for endless purposes. Altogether this region holds in reserve a prodigious storehouse of raw materials, all available for the industrial arts.

Guiana also abounds in timber and cabinet woods, which it is to be feared

may soon attract the attention of those reckless speculators who have already wasted so many woodlands. The *mora excelsa*, a leguminous tree, which overtops all other forest growths, shooting up to a height of 120 or 130 feet, exceeds the oak and even the teak in elasticity and durability; it is unsurpassed for ship-building, and in economic value is rivalled only by the green-heart ebony (*nectandra Rodiæi*).

Dozens of forest trees are met which possess more solidity than the oak, but their specific gravity is for the most part equal to or even greater than that of water. During the last century some of these heavy woods were used for making mortars and gun-carriages. The species suitable for cabinet work are noted for their bright green, yellow, grey, or black tints, their mottled, marble, or satin-like surface. One species which shows in section a lovely spotted brown grain has taken the name of "tiger-wood" from its resemblance to the spotted skin of the American tiger (jaguar). Another is the letter-wood (*brosimum Aubletii*), so called from the deep colour of its surface, on which are inscribed black figures resembling hieroglyphics.

FAUNA OF THE GUIANAS.

In its fauna, no less than in its flora, Guiana forms a land of transition between the Amazonian zone and those of the Venezuelan seaboard and of the West Indies. None of its mammals, saurians, or reptiles belong to it exclusively; and if some of its birds, insects, or other smaller organisms have not hitherto been met elsewhere, it may be almost taken for granted that such forms do also occur in the conterminous regions possessing the same climate, soil, and vegetation.

The species usually spoken of as specially characteristic of the Guianas are those that naturalists have first observed in this region. Such are the marsh or mangrove deer (*cervus palustris*), which frequents the swampy districts; the crab-eater (*canerophagus major*), which preys on crabs and builds its nest in the banks of the creeks; the grey crane (*grus ferrivora*), with the digestion of an ostrich, and nearly as tall; of aquatic fowl, such as duck, flamingoes, herons, ibis, there is a great variety, gathering at times in flocks of thousands. The *tyrannus sulphureus*, most common of all birds, whose voice is heard in every tree, has from its peculiar note received in French Guiana the eccentric name of *Qu'est-ce qu'il dit*, contracted to *Kiskadi*. In the depths of the forest is often heard the metallic note of the so-called bell-bird (*campanero*), of which there are two varieties (*chasmarhynchus carunculatus* and *C. variegatus*). But Mr. im Thurn "never could detect much resemblance in the note of these birds to the sound of a bell. The cry of the first species is more like the ring produced by two pieces of iron struck against each other; but the notes of the male and female birds differ considerably. The cry of the second species is like the sound made by the drill in blasting operations. Then also in the forest is heard an extraordinary deep sound, like the lowing of an ox, and it is long before the traveller realises the fact that this is made by the 'quow' or 'calf-bird' (*gymnocephalus calvus*), a bird no bigger than a pigeon."

In British Guiana the great cayman is confined to the upper courses of the Essequibo and Berbice rivers; nor does it occur anywhere in Dutch or French Guiana, though it is again met in the Franco-Brazilian contested territory. The rivers of Dutch and French Guianas are frequented only by two small species of alligators.

Nearly all the snakes are harmless to man; the small number of venomous serpents take the collective name of *grages* in Cayenne, where they are often met in a torpid state. Some of the boas, especially those of aquatic habits, such as the water camoodi (*eunectes murina*), acquire enormous dimensions. According to Kappler, one killed on the upper Surinam river measured over 43 feet, and Mr. im Thurn's companion shot one in the Potaro river which "proved to be 20 feet in length and three feet in girth at the thickest."

The gigantic low-low, a silurian found in the Essequibo, and much appreciated by the natives, exceeds ten feet in length, and weighs as much as 220 pounds. The pirai or perai (*serasalmu niger*), whose bite is justly dreaded by man, swarms in most of the rivers, and is probably one of the most voracious animals in existence. They not only snap off the feet of ducks and the tails of iguanas, but will even attack alligators, who "do not always escape with whole tails. A perai itself, if wounded by any chance, is at once attacked and devoured by its fellows. If a monkey or bird, when shot, falls in the water, perai rush together from all quarters and carry off the prey before the sportsman can reach it; and more than once, when fishing in clear water, the bait having been taken by some other fish, I have seen the captive, as it was pulled through the water towards the boat, pursued and snatched by rushing perai."—(*Im Thurn.*)

The Guiana Indians are rare experts in domesticating wild animals, such as the agamis (*psophia crepitans*), cranes, hoccas (*crax alector*), parakeets, dogs, aras, and even jaguars. The stranger arriving suddenly near a native homestead is liable to be attacked by these "pets," and unless the owner comes to restore order, he will have much difficulty in reaching the cabin. Of the two species of wild dogs in British Guiana, one, the *maikang* of the natives, commits great depredations on the plantations. These carnivora prowl about in large packs at night, penetrating through the enclosures without giving tongue, and playing havoc with the poultry and other farm-yard animals. The maikang crossed with the common species produces an excellent breed of hunting dogs, which fetch large prices in Georgetown.

INHABITANTS OF THE GUIANAS.

All the Guiana Indians are collectively grouped by the English and Dutch settlers under the respective names of *bucks* and *locks*, terms which, in a sense, assimilate them to the beasts of the field. During the early colonial times the Europeans, ignorant of the different languages and usages of these aborigines, were naturally inclined to regard the various groups as so many distinct "nations." Thus Barrère in 1743 enumerates over forty of such groups in French Guiana alone, without attempting to classify them according to their mutual affinities.

But these ethnical affinities were gradually recognised, and the studies of the missionaries and philologists have now reduced all the indigenous populations of Guiana to three independent families: *Arawak*, *Carib*, and *Tupi*. Even these groups, however, present many points of resemblance in their appearance, physiognomy, and customs, while differing greatly in speech.

THE ARAWAKS.

The oldest group, constituting the aboriginal element in the strictest sense, appears to be that of the Arawaks, a name which has been referred with great improbability to a Tupi word meaning "porridge-eaters." All the natives alike, as well as the Creoles, live on a manioc diet, so that the Arawaks are not specially distinguished in this respect. They are met, all bearing the same name, everywhere throughout the British Guiana seaboard, and under different designations in the inland districts; here they usually call themselves Lokono (Lukkunu), that is, "Men."

The Wapisianas, Tarumas, Atorais (Atorradi) of the upper Essequibo and of the Takutu, and the Palicurs of the contested territory, all belong to this primitive group. At the time of Schomburgk's journey the Amaripa tribe, formerly neighbours of the Wapisianas, were already extinct, or represented only by a single survivor, a woman sixty years old. The coast Arawaks, living in the midst of the whites and of other settled populations with a sort of English jargon as their common medium of intercourse, have all been Anglicised, and are gradually merging in the somewhat cosmopolitan labouring class employed on the plantations. Under the Dutch rule these Arawaks were exempt from the servitude "legally" imposed on all the other Indians.

Those of the Moruka coast stream north-west of the Essequibo estuary are not full-blood Arawaks. During the Venezuelan War of Independence some Orinoco Indians belonging to an unknown tribe, but already largely Hispanified in their usages, took refuge in British Guiana, in order to escape from oppression and massacre. Here they received a concession of some land in the hilly district about the sources of the Moruka, where they settled, cultivating the soil, intermarrying with the Arawaks, and thus reverting to the Indian type. Later some Portuguese immigrants mingled with these half-breeds, while the discovery of the gold mines brought them in contact with the cosmopolitan populations of the auriferous districts.

Till recently the Arawaks, who have their camping-grounds on the banks of the Aruka, a western affluent of the Barima, kept completely aloof from the whites, and of all the natives these alone were unfamiliar with the English language. As amongst the Caribs of the West Indies, some traces of bilingual speech have been discovered amongst them, a phenomenon which can only be explained by the intermingling of two races as the result of conquest.

The Arawaks have preserved many of the old national usages, amongst others certain tests of endurance, such as the whip-game or dance, in which the dancers, all being men, "stand in two rows opposite each other. Each man has in his

hand a whip with a hard strong lash made of fibre. Every now and then a couple retire from the line and use their whips. One stands steadily, one leg in front of the other; the other swings back his whip, and, with all the force he can command, lashes the calf of the first man's leg. Then in his turn the second man stands still to receive a lash from the other. They lash each other in this way until their calves are striped with weals and blood flows freely. The punishment is borne and inflicted with perfect good temper, and was probably originally devised as a test of endurance. Finally the dancers retire and drink together."—(*Im Thurn.*)

These Arawaks appear to have been by far the most civilised of all the Guiana peoples, for they possess fictile vases of most varied forms embellished with ornaments and grotesque human and animal figures in high relief. The pottery of other Guiana tribes is extremely simple, without any decorative work beyond a few rude designs executed in thin lines. To the Arawaks should perhaps be attributed the stone porringers met in several parts of the Guianas, the circle of standing stones seen by Barrington Brown in the Pacaraima Mountains, and resembling that of Stanton Moor, the *timehri* or inscribed rocks of the Berbice, Corentyne, and Maroni rivers, covered with figures of men and animals, especially frogs, together with other eccentric forms, some shallow, some deeply incised.

THE WAPISIANAS AND ATORAIS.

The Wapisianas and Atorais, who dwell about the region of the water-parting, being rarely visited by the English travellers, have still preserved their primitive type. The Atorais would probably be the losers by miscegenation with other tribes, for their women are distinguished by remarkably perfect figures and great dignity of expression. The profile of the face differs little from that of Europeans, and the complexion is almost white. According to Coudrean, many of the Atorais are no darker than the Andalusians, the Sicilians, or the peasantry of South France.

On the other hand, the Wapisianas are of a browner colour, with less regular features and less graceful carriage. Like the Atorais, they have a hairless face with only a few short bristles on the upper lip and chin, while the hair of the head is very abundant. Both sexes pierce the lower lip with at least two pins, and insert another in the cartilage of the nose, to which they attach a piece of metal. This, it would seem, is the distinctive mark of the tribe. Formerly the Wapisiana girls were obliged to have the two upper incisors extracted; but this custom appears to have fallen into abeyance.

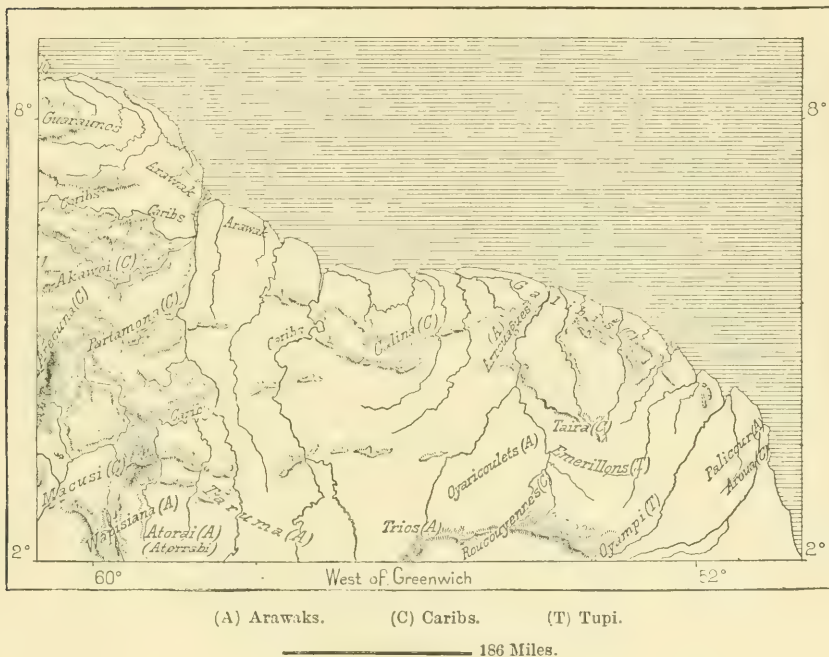
These natives wear nothing but the calembé, the loin-cloth of the negroes; but they pay great attention to the head-dress and other personal embellishments, decking themselves with all the beads, coins, and trinkets they can pick up. Maize is grown, but only to extract from the grain a kind of beer, called *cashiri*, which throws the drinkers into a state of hilarious intoxication. It is during these orgies that the young men's brides are usually carried off, marriage being still made amongst the Atorais and Wapisianas by abduction.

Like most other Guiana tribes, the Wapisianas practise the strange custom of *couvade*. Throughout the region of the divide between the Takutu and Essequibo basins, their language has become the chief medium of trade and general intercourse between the surrounding groups, even those of Carib origin. The Atorais, or at least the men, have almost completely given up their own in favour of the soft and sonorous Wapisian tongue, which, being highly vocalic, is well suited for oratory.

Amongst the indigenous tribes connected with the Arawaks should perhaps be included the Warraus (Guaraunos) of British Guiana, who have their camping grounds in the wooded alluvial tracts of the north-west, and who have partly adopted Christianity. Scarcely differing from those of the Orinoco delta, they live

Fig. 10.—INDIANS OF THE GUIANAS.

Scale 1 : 11,000,000.



like them in cabins built and entirely furnished with the wood, leaves, and fibre of the *Mauritia* palm, from which plant they also procure their clothing, food, and drink. The Warraus never perform any ablutions, in this respect differing altogether from most of the other natives, who take great delight in bathing.

When there are any family disputes to settle, the tribe gathers on some sand-bank, where the men of all ages range themselves in two opposite rows armed with shields made of the *Mauritia* palm. Then all advance, each facing an opponent and watching his opportunity to spring forward and thrust him back. The shields now meet and clash, the two antagonists planting one foot firmly on the ground, and pushing with the knee of the other leg with might and main against his opponent's shield. Whoever succeeds in forcing the other back from his position

is deemed to have gained the case in dispute, which is accordingly settled in favour of the side which has proved most successful in this wrestling match. All the Warrau women, says Richard Schomburgk, have a profoundly sad and indescribably soft physiognomy.

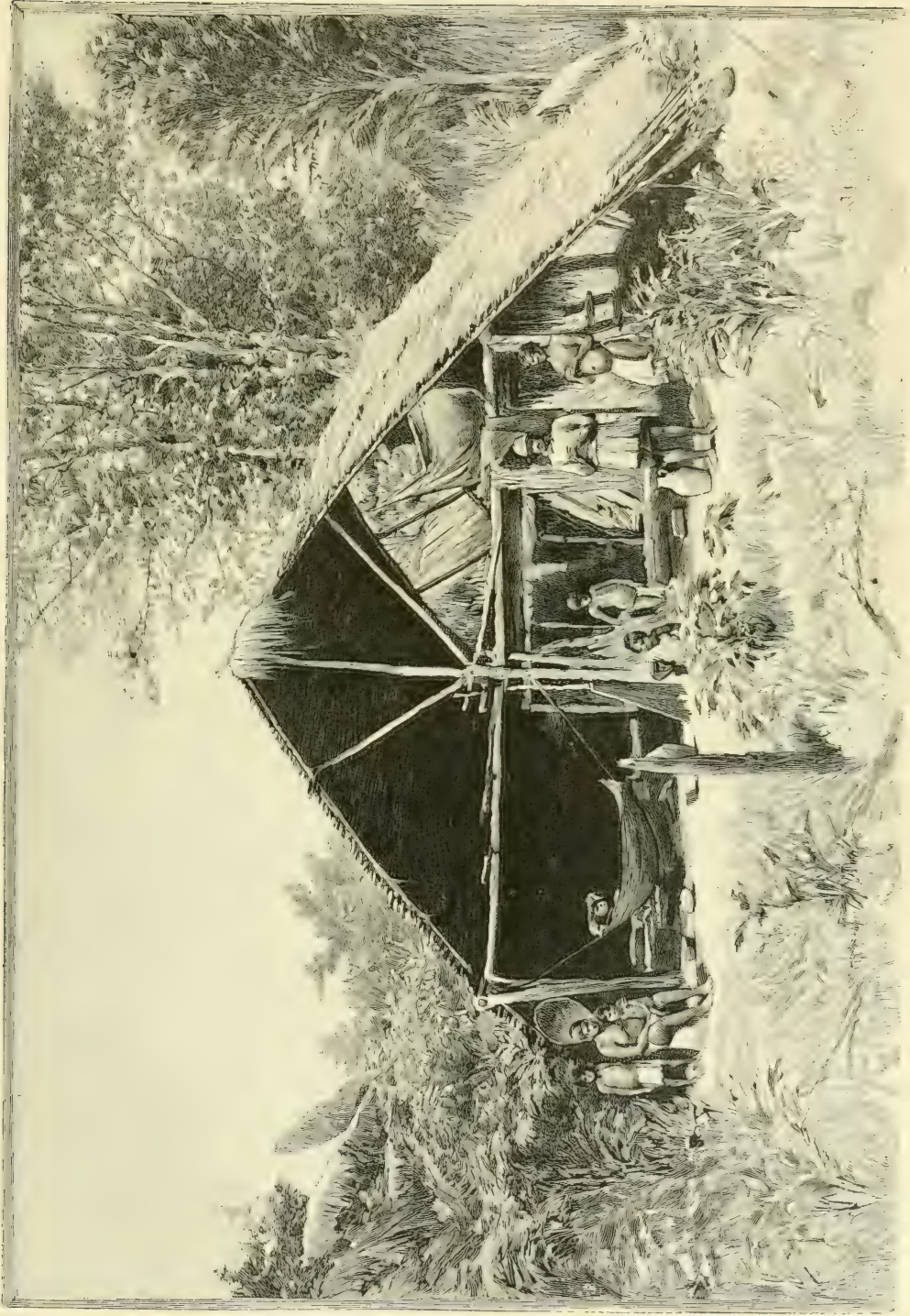
THE CARIBS.

The Carib (Caraïb) division has representatives in every part of the Guianas, and some of the tribes even bear the general name of the whole family. One of

Fig. 11.—GALIBI MAN.



these groups is settled at Warramuri, west of the Moruka estuary, close to an enormous shell mound and other kitchen refuse, attesting a long sojourn of several centuries in the district. To these natives Everard im Thurn gives the distinctive name of "true Caribs," on the assumption that they landed here on their arrival from the West Indies, supposed by him to be the original home of the race. This view is so far confirmed by certain legends bringing them from the north, while



GALIBI HABITATIONS ON THE BANKS OF THE MARONI.

the Caribs themselves claim to have descended from above through a hole in the sky.

But most American ethnologists look on the central regions of Brazil as the most probable cradle of the Carib race, in which case the expression "true Caribs" would be more applicable to the tribes dwelling in the interior of the Guianas than to those now settled on the seaboard. The Galibi of French Guiana, who are also of pure Carib stock, and who even bear this name under a somewhat more euphonious form, have occupied the coast zone west of Cayenne for at least

Fig. 12.—GALIBI WOMAN.



two centuries and a half. Here they had some twenty villages in 1652, and at present some of their settlements are scattered along the Sinnamari and Iracubo rivers, and especially along the right bank of the Maroni.

Another Carib people, the Calinas, remnant of a great and powerful nation, have held their ground in the Surinam valley. To the same stock belong the famous Roucouyennes of the interior, who are so named by the Creoles from the

roucou (rucu) with which they paint their bodies, but who call themselves Wayana, perhaps another form of the word Guiana.

The fine Akawoi (Waika or Kapohn) Indians of the mountainous districts of British Guiana watered by the Mazaruni, the Partamonas of the Potaro river, the formidable Arecunas, who dwell in the upland valleys about Roraima, the Wayewés of the Upper Essequibo, the Tairas of French Guiana, lastly the Macusi about the headwaters of the Rio Branco, all belong to the widespread Carib family, and speak closely related dialects of the same stock language. Like the Wapisiana in the dividing range between the Essequibo and Rio Branco, the Galibi tongue has become a sort of lingua franca for all these tribes. Several Carib words, such as *cayman*, *toucan*, and *hammock*, have found currency in the European languages.

In general, the Caribs of Guiana are inferior in physique to the Arawaks, especially if the Atorais be taken as the type of this race. The Galibi have short, slender figures, while their round, soft, and beardless face gives them a feminine look. The Macusi, though more hirsute, have heavier frames and more massive figures.

Like most Indians, the Roucouyennes look taller than they are, which is due to the length and fulness of the bust contrasting with the slight development of the extremities. The long bandages in which they wrap themselves in accordance with their hygienic ideas give them the appearance of great corpulence. Their figures are very short, while the feet are broad and flat, and the eyelids slightly oblique, as with the Chinese. They have the habit of plucking out the eyebrows "the better to see," as they say, but more probably as an offering to the sun.* Some of the Galibi tribes also follow the Wapisiana fashion of piercing the lower lip with bits of bone or a peg, which they keep constantly moving with the tongue, and of causing the calves to swell by means of wide garters tightly clasped below the knee.

THE TUPI AND OTHER ABORIGINES.

The Tupi, who form the third ethnical division of the Guianas, are a branch of the great Brazilian race represented by hundreds of tribal groups between the Maroni and Plate rivers. In Guiana territory the two chief Tupi tribes are the Oyampi of the Tumuc-Humac range about the Upper Oyapok, and the Emerillons, who dwell farther west between the Approuague and the Maroni affluents. Both are skilled agriculturists, raising quantities of manioc for the gold hunters, with whom they are becoming assimilated in speech and costume.

But amongst the tribes of these inland regions several still survive whose language is unknown, and whom it is not yet possible to affiliate to any of the surrounding ethnical stocks. Such are the Oyaricoulets, who are reported to occupy the valley of the Itani, which flows through the Awa to the Maroni. According to local report—for no traveller has yet described them from personal observation—they have a white complexion, with blue eyes and light beard; hence some writers have felt inclined to regard them as whites keeping aloof from their European

* Élie Reclus, MS. Notes.

kindred. Coudreau, however, was assured by the Roucouyennes that these Oyari-coulets were "like the other Indians."

In British Guiana rumour speaks also of the fabulous Didi, a hairy race, whom all the other natives dread without ever having seen them. But in these regions, when an Indian is afraid of seeing any formidable being, or even a rock of fantastic shape, he rubs his eyes with red pepper. Then, seeing nothing, he is happy in the thought that there is nothing more to be seen.

GENERAL CHARACTERISTICS OF THE GUIANA INDIANS.

But to whatever ethnical divisions the Guiana Indians may belong, they have all very much the same usages. Were habits and customs to be taken as a criterion of racial affinity, many peoples of different speech would have to be classed together. Thus the Galibi, Oyambi, Emerillons, and Wapisianas, all practising the *couvade*, would be grouped in the same category. But such resemblances may be due rather to a common environment and like economic conditions than to blood relationship.

In none of the tribes has authority been firmly established on the model introduced by the European settlers. Certain persons may bear more or less distinctive titles; but for all that they are not true "chiefs" in the common acceptation of the term. Their personal qualities may ensure them great influence, but they must not interfere so far as to issue orders. Each member of the tribe enjoys full personal liberty in all his movements and actions. This freedom extends even to the children, who are never punished. "Dogs alone are beaten," says a Macusi proverb.

Nevertheless, the ordeals formerly inflicted on the young of both sexes on reaching the adult period were atrocious. Thus the mother scourged her daughter while father and brothers slept, and woe to her if her cries roused them from their slumbers. Amongst the Roucouyennes the initiatory rites consisted in subjecting both boys and girls to the sting of wasps and bite of ants. The unhappy victims swooned away in sheer agony without uttering a groan.

To their healing and divining powers the *peaimen* (*piai*, *puyai*, *peartzan*, or medicine-men) are indebted for a larger share of moral authority than that of the so-called chiefs; but even they would never presume to exercise any direct control. Perhaps the veneration in which they were formerly held should in great measure be attributed to the severe trials which they had to undergo before being considered worthy of admittance into this primitive order of priesthood. More than one of the candidates succumbed to the prolonged hardships they had to suffer during the terrible years of novitiate.

But at present the preliminary training has been greatly mitigated and curtailed. The chief instrument of the rite is the *maraca*, a small calabash about the size of the fist enclosing a few rattling pebbles. This *maraca* serves to scare the devil and, if need be, to raise him, especially when a *kenaima* or avenger has to be summoned in case of bloodshed. Inspired by the relentless spirit of the vendetta, the man who undertakes the duty of following and killing

the wrong-doer, or, failing to find him, any of his kindred, is no longer a respecter of persons; for the time being he has neither clan nor family; he disappears in the depths of the forest, and does not again show himself in public until he has throttled, poisoned, or even tortured his victim. But the *kenaima* plays many parts, and to his malevolence are usually accredited all diseases; hence to circumvent him trees are often cut down and strewn across his presumed track.

In some tribes, and especially amongst the *Roucuyennes*, the dead are still occasionally cremated, all their belongings being heaped on the pyre and consumed with the body. All travellers are unanimous in asserting the former prevalence of anthropophagy. But the chief tribes that were addicted to this horrible practice, such as the *Nouragues* of the *Approuague* valley and the *Acoquas* of the *Tumuc-Humac* mountains, have already disappeared. Amongst the descendants of these cannibal tribes are mentioned the *Tairas* and the *Oyampi*.

So recently as 1830 the *Oyampi* still sang the burden of the songs celebrating the old rites: "In the olden time we were men, we ate our enemies; now like women, we eat nothing but *manioc*." The very word *Oyampi* would appear to mean "Men-eaters." But it may be confidently stated that since the close of the eighteenth century cannibalism has completely ceased amongst all the known tribes. The *Caribs* burnt the heart of the vanquished foe, and mingled its ashes with their drink.

The largest share in the steady decrease of the native populations is taken by the warlike tribes, who have generally best preserved their racial purity. More than half of the groups mentioned by the old writers have already disappeared. Nevertheless the survivors are still far more numerous than is commonly supposed. Explorers ascending the rivers often overlook the groups encamped in the recesses of the forests. The indigenous population of the *Guiana* seaboard, exclusive of the *Amazonian* slopes, would appear to still number about 8,000.

THE BLACKS—THE BUSH NEGROES.

Thanks to the slave trade an African population has been introduced into the *Guianas*, chiefly by the *Antilles* route, which, jointly with the half-castes, far outnumber the aborigines. Distributed at first in the plantations of the coastlands, and afterwards removed by their owners to the towns as domestic servants, the negroes have everywhere throughout this region supplanted the aborigines, who have retired before the progress of culture farther and farther into the backwoods.

A stop was put to the importation of black labour in the *Guianas* by the abolition of slavery, first proclaimed in the French territory in 1794, and later carried out effectively in *British Guiana* in 1838, and successively thereafter in the other colonies. Nevertheless a part of the overflowing black population of *Barbadoes* found its way to the *Guianas*, thus continuing the movement of African immigration by new elements under new conditions. Thousands of free *Kroomen* from *Liberia* also find employment in the timber-yards and as sailors on board the coasting vessels. But after procuring by strenuous efforts enough money to

purchase several wives, these natives of Liberia usually return to their native land.

At present the Guiana negroes form two natural groups—the descendants of the slaves who, after intermingling with the free immigrants, have always remained in contact with the white settlers on the coast, and the independent blacks, who live in the interior of the country. These descendants of the Maroons, or runaway slaves, who have now become peaceful citizens, reconciled with the offspring of their former masters, are universally known as *Bush Negroes*, the *Bosch Negers* of the Dutch, and the *Nègres Boch* or *Nègres des Bois* of the French.

But, despite their name, these blacks do not roam the woods like wild game, but are, on the contrary, peaceful agriculturists, settled along the banks of the river, where they occupy permanent villages surrounded by cultivated lands. Negro republics have been founded in the British, Dutch, and French territories; but the most numerous groups have established themselves in the Surinam and Maroni river basins.

The first migrations took place in the year 1663, when the Portuguese Jews of the Surinam valley sent their slaves to the forests in order to avoid the poll-tax, hoping they would return as soon as the tax-gatherers' backs were turned. But the fugitives, having tasted freedom, remained in their camping-grounds. About fifty years later (1712) some French marauders having invaded the Surinam and Commewijne riverside plantations, the proprietors took refuge in the capital, leaving their slaves to shift for themselves. The majority joined the French in plundering the abandoned houses, and on the return of the owners took refuge in the neighbouring forests, where they began a protracted war of pillage and reprisals with the whites.

The number of predatory bands increased from year to year, and suddenly, in 1730, a formidable insurrection broke out in the Upper Surinam basin on the plantations belonging to the Government itself. The struggle lasted with varying success for nearly 20 years, when the authorities were fain to recognise the insurgents as belligerents and freemen. Then followed a treaty of peace, in which the boundaries of the independent territory were determined.

Other risings took place in 1757, when Arabi, a chief probably of Mahomedan origin, defeated the Dutch planters, and in 1761 compelled the Government to agree to terms of peace in the treaty of Auca, from which the principal black republic became known as that of the "Aucan (Jocan, Yukan) Negroes." Next year another group, that of the Maroons of the Saramacca river, also secured its political independence. Later other communities were established, such as those of the Poligudus (Poregoedoe) and of the Paramaccas on the Upper Maroni, the Koffi, Becoes, Matrocanes, or Musingas.

In 1772 Boni, the legendary hero of the Bush Negroes, led his bands nearly up to the very walls of Paramaribo. Regular war had to be declared against him, and an army of 1,200 men despatched from Europe, one of the chief officers being Stedman, well known for his excellent work on Guiana. The war lasted several

years, during which nearly the whole of the expedition perished, scarcely 20 of the men returning in good health to Europe. At last an alliance with the Aucans, who had remained loyal to their treaty engagements, enabled the Dutch to drive Boni back to the foot of the Tumuc-Humac mountains.

As a general rule the negroes of the interior succeeded in asserting their independence, while the slaves on the coastlands about Paramaribo and the forts were crushed by the disciplined troops opposed to them. The Maroons of the West Indies, even those of the large island of Jamaica, were never able to make head against regular soldiers proceeding systematically to the general occupation of the islands by erecting forts and opening strategical routes. But the Bush Negroes of Guiana had space in their favour. They were always free to retire farther and farther towards the unknown interior, and thus escape the pursuit of their owners.

Various estimates ranging from about 8,000 to some 20,000 have been made of these Bush Negroes, who till recently enjoyed absolute independence, but who are now being brought gradually under the control of the central administrations. Owing to the interminglings brought about by slavery, migrations, and wars, all memory of the original stock races has perished, and the only known fact, obvious enough in itself, is the almost pure African descent of the Maroons. Of these, the finest and most civilised are the Aucans, while the most degraded by isolation and poverty are those belonging to the Matrocane communities.

But according to Gifford Palgrave, all alike present a perfectly African type. "The men are often six feet and more in height, with well-developed limbs and pleasing open countenance; and the women in every physical respect are, to say the least, worthy of their males. Ill-modelled trunks and disproportioned limbs are, in fact, as rare among them as they are common among some lighter-complexioned races. Their colour is, in general, very dark, and gives no token of the gradual tendency to assume a fairer tint that may be observed among the descendants of negroes residing in more northerly latitudes. Their hair, too, is as curly as that of any Niam-Niam or Darfooree chief, or native of Senegal. I have heard it asserted more often than once that, by long domicilement in the South American continent, the negro type has a tendency to mould itself into one approaching that of the Indian aboriginal; and something of the kind might be looked for, if anywhere, among the Bush Negroes of the Surinam interior. But in the specimens that I saw, and they were many, I could not detect any such modification."*

Nevertheless, both Paul Lévy, who has lived with the negroes of the auriferous regions, and Carl Appun, who resided many years in British Guiana, affirm that the tendency is perceptible. The colour of the skin would appear to be less black, the hair longer and less woolly. But it is not always easy to distinguish between full-blood and half-caste types, and interminglings have taken place not only between blacks and Europeans, but also between blacks and Indians. Thus the Carbougres (Karboegers) of the Coppename river are the issue of negro

* *Dutch Guiana*, p. 170.

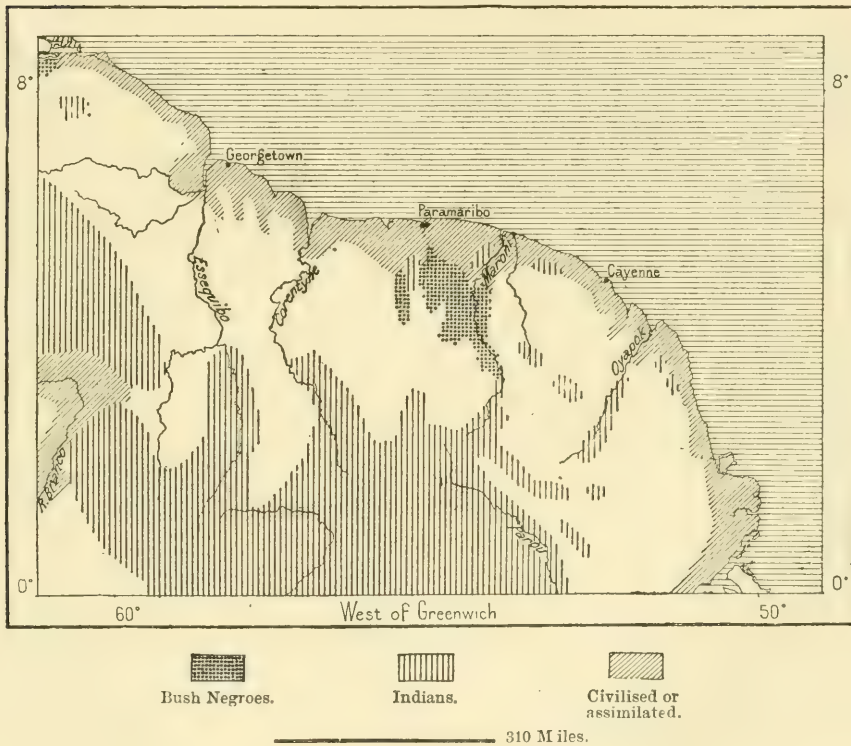
fathers and Indian mothers, and consequently any inferences drawn from their appearance would be fallacious.

Some few words of the African negro or Bantu dialects are said to have been preserved in the language of the Maroons, which has an English basis with a very large Portuguese element. Next in order of importance come the Dutch and French contributions, all uttered with the thick soft African pronunciation, and connected together by an extremely simple syntax. But this primitive jargon is gradually yielding to the cultured languages, English, Dutch, French, and Portuguese, of the European settlers.

Descendants of the black insurgents, whose war-cry everywhere was "Land and

Fig. 13.—INHABITANTS OF GUIANA.

Scale 1 : 13,000,000.



Liberty," the Bush Negroes have all remained agriculturists. They grow sufficient produce for their own consumption, and also supply the towns and plantations of the seaboard with rice. But their main resource is wood-cutting, which is exclusively in their hands. They fell the large forest trees suitable for building and cabinet work, and convey the lumber to Paramaribo by the rivers and canals. They run little risk of losing this monopoly, thanks to their sober habits, by which they are favourably distinguished from the aborigines. They have, however, suffered from the demoralisation rampant in the gold-mining districts. Indispensable as boatmen on the upper courses of the rivers, they show remarkable skill in managing their *corials* or *curiaries*, and the light craft to which the English have given the

name of "wood-skins." These are frail canoes made from the bark of *copaifera publiflora* or of *hymenaea courbaril*, like the birch-bark canoes of the Huron Indians.

So early as 1739, the Moravian missionaries had already founded stations amongst the Bush populations, but they have had little success except with the Moesinga communities. From a vague reminiscence of the teachings received during the period of slavery on the plantations, the negroes have retained a sort of belief in a Supreme Being, creator of man, monkeys, and manioc, on the whole a beneficent deity, whose wife was called *Maria*, and whose son bore the name of *Jest Kisti*. But apart from this shred of Christianity, most of the Bushmen have preserved their nature worship, and, in fact, "they believe what their mothers believed." But the fervour even of this primitive cult seems to be on the wane in most of their villages, and the fetishes and *gadus* or effigies of tutelary animals have generally disappeared from the neighbourhood of the white settlements.

At present the chief object of negro worship is the ceiba or cotton-tree, that noblest forest growth of the West Indies, which rises in solitary grandeur in the vicinity of the settlements, its wide-spreading branches affording shelter to the community like some beneficent deity. Traces may often be seen of offerings, such as fowls, yams, libations of drink, scattered round its stem, the object being to propitiate the spirit dwelling in its branches, who is of a beneficent disposition, unlike his demon brother of the poison tree *Hiari*, who also finds some votaries inspired rather by fear than gratitude.

No idols properly so called are worshipped, but the negroes of the more inland districts cover themselves with *obeeahs* or amulets of shells, bones, or feathers; such charms are even hung round the necks of their dogs to improve their scent in the chase. A curious trait is the custom of bringing back and burying with all honours the hair of those who may happen to die at a distance from their homes.

These communities dwell in peace unruffled by the wranglings of rival chiefs contending for the supreme power. Enjoying an equal share of comfort, the Bush Negroes also enjoy absolutely equal rights. Nevertheless every village has its nominal headman nearly always chosen from the same family, and distinguished amongst his fellow-citizens, not by any personal authority, but by the privilege of parading on feast days in a military uniform and flourishing a gold-headed cane in public.

But the chiefs in a pre-eminent sense, those of the Aucan community, bear the distinctive title of *Gramman*, from the English "Grand Man." The Aucan chief is allowed a respectful precedence by his Saramaccan and Moesinga colleagues, and is, in fact, recognised as the overlord of all the Surinam Bush Negroes, though in rank and title rather than in power. His pedigree goes back to the first Aucan chief, Pamo, but in the female line, the matriarchal traditions having been preserved from times anterior to the period of slavery. The Gramman is even recognised by the Dutch Government, which, however, has taken the precaution to provide him with a European Resident under the title of *Posthouder*. This

“Postholder” was formerly a simple delegate from the whites, who at last became the chief magistrate and arbitrator in lawsuits between private persons and in differences between the various village communities. The Gramman of the Boni people in French Guiana is no longer much more than a civil functionary receiving a regular subsidy from the Colonial Government.

Like the aborigines, the negroes, other than the immigrants from Trinidad, Barbadoes, and Martinique, are decreasing, although the climate of the Guianas appears to be as favourable to the black-race as it is unfavourable to Europeans. Miscegenation with other races may, to a small extent, explain this decrease; but even amongst those living apart, as well as amongst those intermingled with the cosmopolitan populations of the towns and coastlands, the number of deaths exceeds that of the births everywhere except amongst the Aucans. In the last century it was supposed that the Africans could never multiply in Guiana, because nearly all the infants died of convulsions during the first nine days after birth.

This excessive mortality is attributed by Palgrave to the ill-regulated affection of the mothers for their offspring, whom they literally “kill with kindness,” which takes the form of overfeeding. But this cause being prevalent elsewhere as well as in Guiana, some other explanation must be sought. It would seem, in fact, that the blacks have not yet become perfectly acclimatised, as shown by their feeble resistance to such disorders as leprosy, elephantiasis, small-pox, and many others, which commit great havoc amongst them. Those dwelling in the bush are also exposed to the attacks of the *lucilia hominivora*, a horrible insect pest which deposits its eggs in the ears and nostrils with fatal results.

THE COOLIES—EUROPEAN SETTLERS.

After the emancipation most of the freedmen having abandoned the plantations either to seek work in the towns or else to cultivate their own holdings, the great landowners had to seek elsewhere for labourers. French and Dutch Guianas were too poor to import many alien hands; but British Guiana, with its wider extent of cultivable lands, and with the great labour market of British India thrown open by the Government, has engaged no less than 170,000 Asiatic coolies since the year 1845. At present this element represents fully one-third of the whole population of the English colony, the most valued being the so-called hill-coolies from the uplands south of the great bend of the Ganges. Emigrant offices have been opened in Calcutta and Madras to meet the demands of the Demerara planters, who have also engaged a few thousand Chinese coolies.

On the other hand, the Surinam planters have introduced labourers from Java, while Arabs, Annamites, and Senegal negroes have been attracted to the French colony. Even white labour has been sought, but only in such markets as Madeira and the Azores, whose inhabitants are accustomed to a tropical climate. These immigrants, collectively called “Portuguese,” though a very mixed race, seem destined to become the true ethnical element of the Guianas of the future. They have already established themselves in several districts beyond the zone of plantations which it has taken the French, Dutch, and English some two hun-

dred and fifty years of patient labour to reclaim from the swamps and woodlands. Even the whites who formerly succeeded best in Dutch Guiana were Jews for the most part of Portuguese origin. The chief group, a body of Hebrew planters expelled from Brazil, arrived in 1663, and to their influence is due the large proportion of Portuguese words that have found their way into the Creole language of the Bush Negroes.

All the costly attempts to colonise the country with whites drawn from other lands have ended in disaster. Individuals of strong constitution may no doubt become acclimatised by carefully observing all the rules of health. But to adapt whole families and communal groups to an environment so different from that of Europe is certainly a far more dangerous and difficult experiment than to settle them in Canada or the United States, especially when the emigrants are deprived of ordinary comforts and even of proper food, as has too often been the case. Although consumption is almost unknown on the coastlands, the new arrivals are rapidly decimated by the marsh fevers, which are most dangerous, especially when the hot sun begins to suck up the deadly exhalations in the swampy districts. Since the year 1855, yellow fever also has made frequent visits to this seaboard.

Hence the Europeans, although the political masters of the land and owners of the plantations, have remained practically aliens in the midst of a motley cosmopolitan population, in which the half-caste elements are steadily increasing. Except in some favourable years, the mortality is always higher than the birth rate, and meanwhile the Europeans of pure descent are being outstripped on all sides by the Portuguese islanders from the north, by the Brazilians, also of Portuguese speech, from the south, by the Spanish Venezuelans from the west; in a word, by intruders of Latin speech and culture arriving from every quarter.



SOUTH AMERICA

1894.

Based on the text of the Universal Geography and other recent Documents.

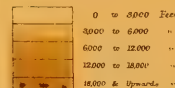
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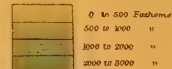
The relative importance of towns in the various regions is indicated as far as possible by the size of the type.

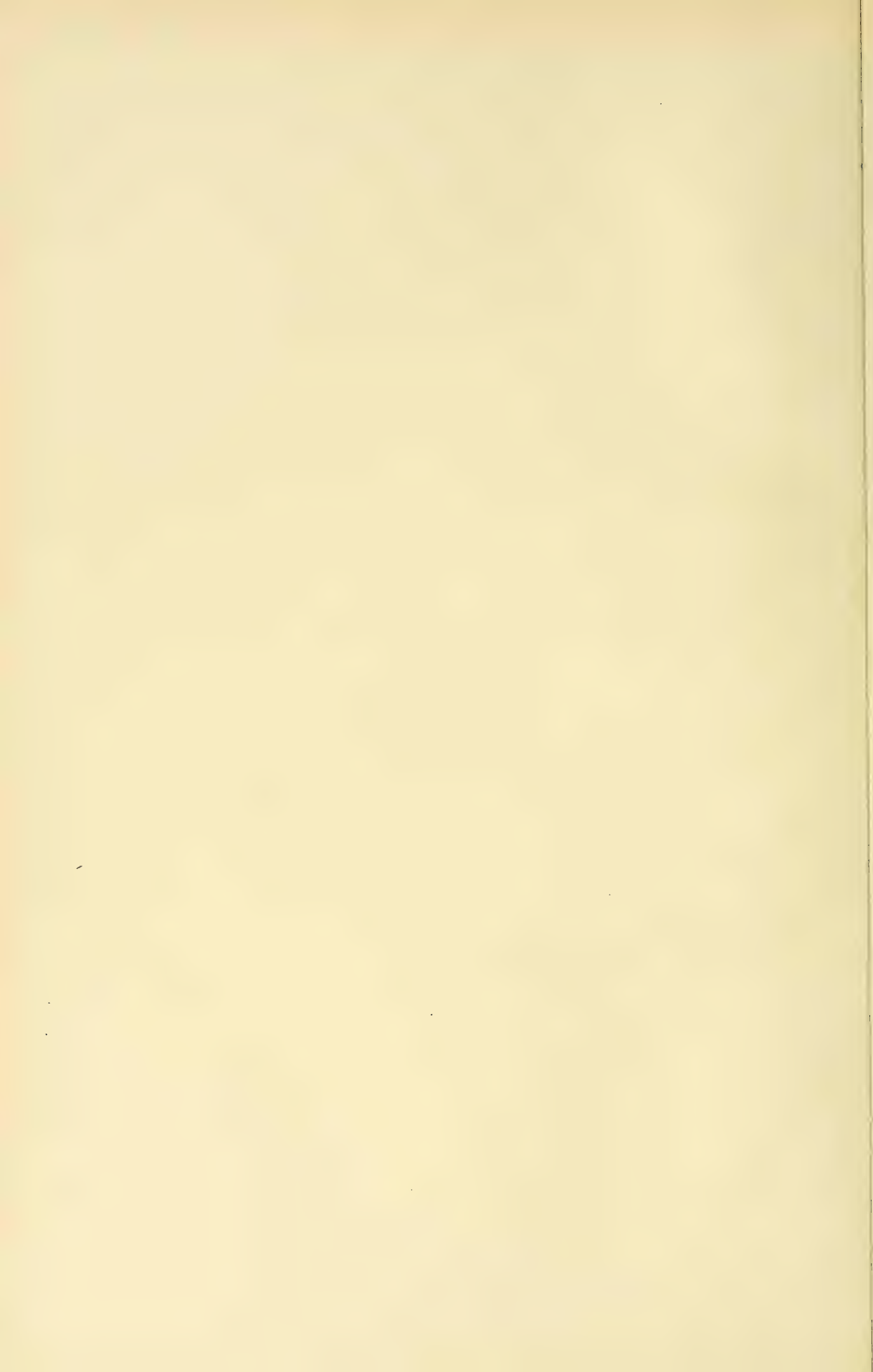
- Over 100,000 Inhabitants
- Over 50,000 "
- Over 25,000 "
- Over 10,000 "
- Under 10,000 "

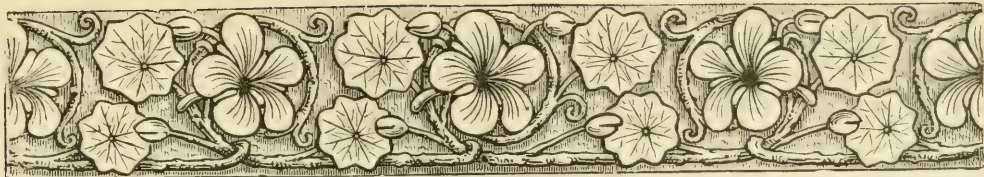
Heights



Depths







CHAPTER II.

BRITISH GUIANA.



THIS section of the Guianas, with its still undetermined political frontiers, is by far the most important, both for population and commercial activity. It is usually taken for granted, without further inquiry, that this remarkable superiority of British Guiana as a field of enterprise is primarily due to the administrative genius of the English. But if this relative prosperity may at least in part be attributed to the non-intervention of the home government in local affairs, to the comparatively limited staff of office-holders, and to the continuity of the policy pursued towards the colony, it is none the less true that British Guiana also enjoys considerable natural as well as political advantages.

In the first place, it possesses the largest river basin, while its chief plantations are more accessible to shipping both from Europe and the West Indies. Hence these plantations had already been profitably worked by the Dutch long before the English conquest. The cultivable zone stretches along the coast, with a good seaward outfall for drainage purposes. Consequently, numerous towns and villages have been founded and estates laid out in close proximity between the Atlantic and the stagnant waters of the interior. But in Dutch Guiana and in the greater part of the French colony the marshy zone lies on the coast, masked only by a mangrove screen from the ocean.

It was easy to begin agricultural operations on the open coastlands of the British territory, and, thanks to the proximity of the West Indies, the first planters, for the most part Scotchmen, were able without difficulty to procure all the labour they needed. Since 1802, when Great Britain occupied this northern part of Guiana, which was officially ceded to her in 1814, the rulers of the land have largely profited by the neighbourhood of the West Indian colonies to favour the immigration of the negroes of the overpeopled island of Barbadoes, as well as of the large island of Trinidad. Later, when the emancipation deprived the great landowners of the slaves who worked their estates, the Indian Government threw open its coolie market for the benefit of the wealthy sugar-growers of Demerara.

All these circumstances secured for British Guiana a decided advantage over the conterminous colonies, and as a natural result this very advantage brought

about a better commercial status, a more rapid development of its industrial resources, more numerous and more active relations with the outer world. All actual progress acts as a stimulant of further prosperity. If British Guiana is no more a colony in the strict sense of the word than are the other two territories under European rule, it has at least become a sphere of spontaneous colonisation for settlers from the West Indies and the Azores. In ordinary language, the English speak of their possessions on the South American mainland as in fact forming part of the West Indies.

THE NORTH-WEST DISTRICT.

Till recently the zone of large agricultural domains was limited in British Guiana to that section of the seaboard which is comprised between the Pomerun and Berbice rivers. The north-western region, the possession of which is contested by Venezuela, remained uninhabited. During the early days of colonisation a few Dutch settlers had established themselves on the banks of the Pomerun, the first arrivals dating from the year 1580. But they had never advanced westwards in the direction of the Orinoco. Their plantations on the Pomerun itself were even abandoned one after the other, and about the middle of the nineteenth century the only inhabitants of this district were some Indians and negro half-breeds encamped in the forest glades. The latter are descendants of runaway slaves who had taken refuge here in 1738, and whom their owners feared to pursue; but the Maroons on their part did not dare to remain in the vicinity of the whites, and so joined the Indian tribes.

Regular colonisation in this district was first undertaken by some Portuguese speculators about the year 1870, and since then agricultural progress has been continuous and rapid. The chief difficulty was the interruption of the communications during the dry season. The *itabbo* or ditch connecting the Moruka and Waini rivers is completely dry for six months in the year, and even during this period the alluvial lands are not firm enough to afford a footing to wayfarers in the woodlands between the two basins.

At present the steamers plying between Georgetown and the Orinoco delta have brought the whole of the "north-western district" into easy relations with the rest of the colony. The new domain thus opened up has been occupied at three different points by traders and others engaged especially in the lumber business. One, lying nearest to the plantations on the banks of the Pomerun, stands at the junction of the waters formed by the Baramanni lagoon with the Waini river; another at the confluence of the Morawhanna, which connects the Barima with the Waini; the third at the mouth of the Barima in the Orinoco estuary. The natural and administrative centre of the whole district is the *Morawhanna* station, where the British Government has erected a group of public buildings, including a courthouse, police barracks, and hospital.

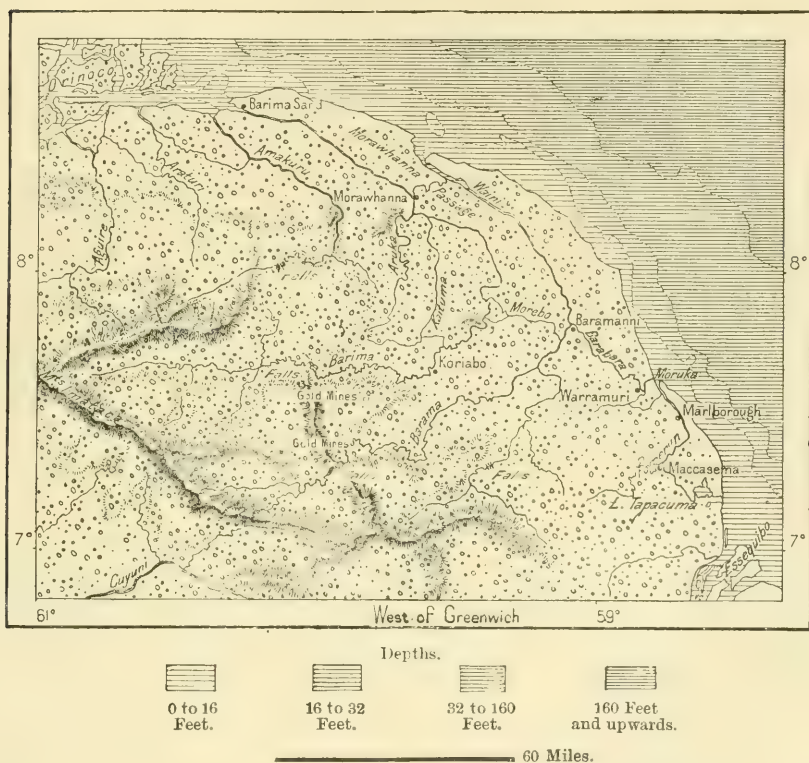
This may be taken as a proof of the determination of the Foreign Office absolutely to ignore the pretensions of Venezuela to the north-western district, which has a superficial area of 9,400 square miles. In colonial times the nearest

Spanish stations were those on the banks of the Orinoco beyond the frontiers proposed by Great Britain, and since then no part of the territory has ever been occupied by the Venezuelans. The negotiations that had been opened in 1894 with a view to the settlement of these frontier questions fell through because the Venezuelan Government insisted on including their groundless claims to the north-western district, claims that the British Government "considered to be so unfounded in fact, and so unfair to the colony of British Guiana, as not to be proper subject for arbitration" (Lord Rosebery).

The lower alluvial parts of the district comprise some of the richest soil in

Fig. 14.—NORTH-WESTERN DISTRICT, BRITISH GUIANA.

Scale 1 : 3,000,000.



the world. Some of the tracts that have recently been drained "now yield crops of tropical produce in simply amazing abundance. As an illustration of this I may mention that the garden which hardly two and a-half years ago I cleared and drained for myself now already has in it avenues of trees (*casuarina*) over 40 feet high which I then planted. On the other hand, the higher part of the new district is being fast overrun by very successful gold-diggers." *

THE ESSEQUIBO BASIN—QUATATA.

Despite its vast extent and the great development of its ramifying waters, the Essequibo river basin has hitherto received but a very small portion of the Guiana

* Im Thurn, *Proceedings of the Royal Geographical Society*, October, 1892.

populations, nor has any centre of European enterprise been yet established within its limits. The region about its headwaters is occupied by the Taruma Indians, who are rarely visited by travellers, and whose relations with the colony are conducted through the agency of a few traders thinly scattered over a wide space.

Groups of hamlets follow at great distances along the course of the rivers, especially about the portages, where the cataracts have to be turned by the boatmen. The river traffic carried on by their means is almost entirely limited to the section of the Essequibo below the confluence of the Rupununi, although this affluent follows the natural route between the Atlantic and the Amazons basin through the Pirara depression. But everywhere the riverside stations are wide apart, and till recently they were exclusively inhabited by Indians and half-breeds, with a few black or Portuguese dealers from the distant coast towns. Nevertheless, there can be no doubt that sooner or later the broad highway leading from the Atlantic to Amazonia will acquire great commercial importance.

Meanwhile, the chief group of huts near the Pirara depression is the obscure village of *Quatata*, trysting-ground of the Wapisiana, Macusi, and Wayewé Indians, who here carry on a barter trade in hammocks, sarbacanes, and other objects of native industry, taking in exchange the cutlery, beads, dogs, and manioc rasps supplied by the European dealers. The natives have been visited both by Protestant missionaries from Demerara and by Catholic Fathers from Manaos, and near Quatata are seen the remains of the little *Fort New Guinea*, erected by the English to uphold the claims of Great Britain to this important strategical position. The district is yearly visited by half-caste Brazilian immigrants engaged in stock-breeding.

BARTICA.—ZEELANDIA.

At the confluence of the navigable Mazaruni and Cuyuni affluents above the estuary stands the little town of *Bartica Grove*, or simply *Bartica*, at one time a flourishing mission station, till lately reduced to a few wooden huts embowered in the overhanging riverside vegetation, a recently restored church, some small residences, and a few timber-sheds. The picturesque village, with its avenues of tall mango-trees and tangle of flowery shrubs overtopped by groups of graceful palms, was till recently occupied chiefly by the so-called "river-men," idle negroes and half-breeds, who make a precarious living on the Government timber-grants, or as boat-hands to help travellers in surmounting the numerous cataracts of the Essequibo affluents.

Since 1887 the prosperity of Bartica has revived, thanks mainly to the development of the gold-mining industry in the western districts. The place is now rapidly increasing, and tends to become the chief trading centre of the colony. Chinese and Portuguese traders have already opened numerous stores for the supply of the mining populations, and the future of Bartica seems to be assured by its advantageous position at the converging point of a network of navigable waters leading in one direction up the Essequibo to the Amazons and Brazil, in another by the Cuyuni towards the Orinoco and Venezuela.

A few miles to the west an eminence rising above the left bank of the Mazaruni-Cuyuni, a short distance above the confluence, is crowned by the extensive buildings of the penal settlement, established in 1843, and containing about 300 convicts. To prevent the prestige of the ruling race from being lowered, no English criminals are confined in this establishment, which is surrounded by a magnificent park, planted with fine trees of rare species. The mansion of the governor, the houses of the officials and turnkeys are all shaded in an exuberant vegetation of tropical growth.

The convicts are mostly employed in working the neighbouring quarries, which supply Georgetown with the granite required for its quays and buildings. Some of the well-conducted enjoy a moderate share of freedom, being allowed to seek employment in the district as carpenters, gardeners, or woodmen. A steamer plies regularly between the settlement and Georgetown, Bartica being the chief station on the route.

Below the Mazaruni confluence the Essequibo develops its broad estuary, at first in an open expanse some miles wide, and lower down in numerous channels winding between an archipelago of islands, nearly all inhabited. One of these, three miles from the sea, contains the still-imposing ruins of Fort Zeelandia, which was erected by the Dutch in 1743 as the commercial and administrative centre of their colony. Each island is rounded off in a superb dome of rich vegetation, while the view is everywhere bound by a circle of arborescent growths. The larger members of the archipelago are occupied by plantations surrounded by large timber, and cultivated grounds stretch along the estuary north-westwards in the direction of the Pomerun, north-eastwards towards *Georgetown*, at the mouth of the Demerara.

GEORGETOWN.—NEW AMSTERDAM.

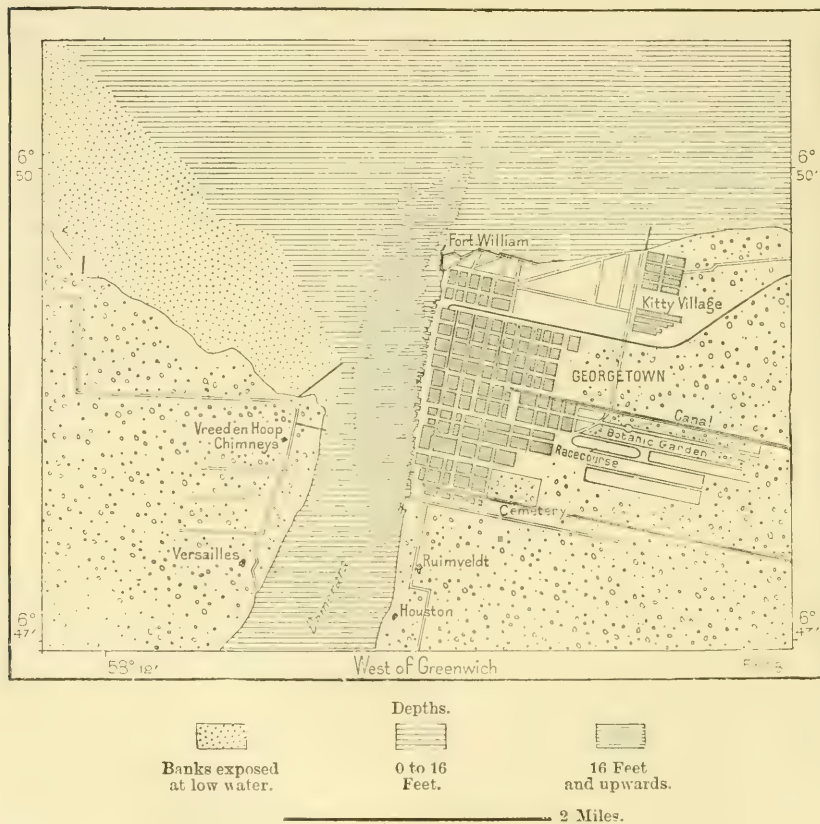
The old Dutch town of *Stabroek*, which in 1774 supplanted Zeelandia as the residence of the governor, has acquired considerable importance since it has become the capital of British Guiana under the name of Georgetown. It is already the largest centre of population on the stretch of seaboard between the Orinoco and Amazons estuaries, and here are concentrated twice as many inhabitants as are found in the whole of French Guiana. Yet, seen from the sea, Georgetown almost escapes observation, little being visible except a dense mass of leafy vegetation overtopped by clumps of cocoanut palms and oreodoxas. But a nearer view reveals the shipping which crowds the broad Demerara estuary, with a background of elegant white houses skirting the right bank of the river.

Georgetown, which is inhabited in large majority by blacks and people of colour, extends considerably over a mile along the estuary between *Fort William* at the entrance and the group of villas dotted over the plains. Even in the vicinity of the busiest thoroughfares and of the quays where are stored nearly all the products of the Guianas, the houses with their verandahs of flowering creepers are surrounded by shady gardens, and each dwelling has its cistern for watering the trees and flower-beds.

Numerous artesian wells, sunk at distances of 300 or 400 yards, yield a supply of water slightly charged with minerals. Till recently the suburb of *Hopetown* was almost exclusively inhabited by Chinese, and a large agricultural population is also distributed over the rich and carefully cultivated plantations which extend for great distances round about the capital, both on the seaboard and along the river banks. The railway running eastwards to *Mahaica*, on the river of like name, has developed a large local traffic in goods and passengers. This line, 23 miles long, dates from the year 1850, being the first opened in South America; it is to be continued towards *Berbice*, but is meantime the only railway in British

Fig. 15.—GEORGETOWN.

Scale 1 : 57,000.



Guiana. At *Mahaica* has been founded a lazaretto, with accommodation for about 200 victims of leprosy drawn from every part of the colony.

New Amsterdam, called also *Berbice*, from the river on the right bank of which it stands, occupies in the eastern district a position analogous to that of *Georgetown* farther west. As indicated by its name, this place is also of Dutch origin, as might almost be inferred from the numerous canals flowing between its different quarters. Although the first buildings date from the year 1796, subsequent changes have failed to efface the primitive aspect of the town, with its silent canals, its shady squares, and quaint houses embowered in verdure.

MATERIAL CONDITION OF BRITISH GUIANA.

As in other regions exploited by slave labour, field operations, performed by men like machines, controlled by overseers armed with the lash or the stick, were incompatible with the cultivation of any great variety of crops in British Guiana. Simple processes carried out in a mechanical way were alone possible; hence the products of the sugar-cane—rum, “foots,” molasses—besides cotton and coffee, were the only articles of export during the plantation days. Even still, despite the abolition of slavery, the crude old agricultural systems linger on, and land tenure has undergone no change, large domains still everywhere prevailing. Only the gangs of black slaves are now replaced by contract labour, though the Hindoo coolies have to conform to the same old rigid methods of routine work. A single estate on the left bank of the Demerara comprises as many as 5,600 acres, and yields 5,500 tons of sugar, employing altogether 3,730 coolies and freedmen.

The administration, however, has at last discovered that it would be unwise to dispose of the remaining unallotted lands in great domains. With a view to attracting settlers, efforts are being made to create a numerous class of small freeholders by limiting to 50 acres the lots granted to new arrivals.

THE SUGAR INDUSTRY.

As in the slave days, sugar continues to be the staple crop. About half of all the cultivated land is under cane, and this single item represents on an average over nine-tenths of all the colonial exports. Thanks to the fertility of the soil, improved processes of production, and the excellent quality of the sugar, the Demerara planters have hitherto been able to hold their own against the fierce competition of the European beet-sugar growers. But to maintain their ground they shrink from no necessary outlay. While utilising the upheaved strip of coastlands, they have encroached on the sea itself, by the construction of an exceedingly costly system of dykes, which at the same time serve as roads.

The land has been cut up by a network of canals and trenches, by which the surface is drained, while facilities are afforded for the transport of the cane. The soil is renovated by a liberal employment of chemical manures, and the mills have been provided with the most improved machinery and general plant for crystal-lising the sap to the best advantage. The cane, containing on an average 17 per cent. of sugar, is thus made to yield as much as 16 per cent., whereas by the old processes of crushing scarcely one-half could be extracted. The best “Demerara” commands on the English markets prices far higher than the product of all other sugar-canes. It is also exported to Nova Scotia, Newfoundland, and other British colonies, and, despite the heavy protective tariffs, it competes successfully with the sugars of Louisiana and of Cuba in the United States markets. The Demerara rum, which is greatly inferior to that of Jamaica, is exported chiefly to Great Britain; while the Georgetown molasses are highly appreciated in the French Antilles.

The Berbice coffee plantations, which formerly yielded a choice variety of the berry, have now been almost everywhere replaced by cane; in fact, the shrub is

scarcely anywhere met except in gardens and in the small negro holdings. Next to sugar the chief product of British Guiana at present is lumber, which is cut by the Partamona and Calina tribes on the banks of the Essequibo above Bartica and in other fluvial valleys south of the plantations. These Indians are closely related to the Galibi who dwell on the banks of the Maroni about the Franco-Dutch frontiers.

In late years the trade in fruits, cocoanuts, and bananas has acquired some importance, and, despite the distance, might compete with the fruit trade that has sprung up between Central America and the United States. The Guiana fruits, especially the bananas, have a delicate flavour fully equal to those of the West Indies, Costa Rica, and Guatemala.

TRADE—ADMINISTRATION.

Altogether British Guiana has a mean annual export trade of about £8,000,000 in sugar and other products of cane, timber, cabinet woods, and fruits, to which in late years have been added gold dust and small diamonds collected on the banks of the Barima and Cuyuni rivers and in the alluvia of the coast streams in the north-western district. "In 1884 the gold exported was only 250 ounces from the whole colony, and this had increased in steady and natural ratio in 1891 to 101,297 ounces. From the Morawhanna river, from which the first gold—129 ounces—was obtained only in November, 1889, 2,836 ounces were obtained, in March, 1892. It should be added that though the metal as yet obtained has been got by means of such primitive instruments as the battel, the tom, and the sluice from the alluvial mud, there are already signs that the more serious enterprise of quartz-crushing will soon be entered on." *

British Guiana imports provisions, machinery of all kinds, textile fabrics, and other manufactured wares chiefly from England, and to some extent from the United States. Georgetown is now connected by regular lines of steamers with Great Britain, the West Indies, and Canada.

Till the year 1831 Demerara and Berbice constituted two distinct colonial governments, as they had under the Dutch rule. Most of the laws and local regulations had been maintained, and numerous traces still survive of this system. The political power is almost exclusively in the hands of the governor as representative of the Queen. He is assisted in his administration by a "Court of Policy" composed of the five chief colonial officers, and of five members chosen by the Court and the two presented by the notables, who form electoral bodies numbering altogether 2,046 in 1893.

To the Governor and Court of Policy are also entrusted the legislative and executive functions. But in determining the rate of taxes the Governor has to consult six financial representatives, who form, with the other Government officials, a "Combined Court." The colony is still administered under the Dutch civil law, modified by various decrees and ordinances; but the criminal law has been conformed to that of England, though the jury system has not yet been adopted.

* Im Thurn, *Proc. R. Geo. Soc.*, October, 1892.

The so-called "Rhenish" scale of weights and measures still prevails on the banks of the Demerara, although abolished in Holland itself.

The police comprises a few hundred men, while the military garrison numbers about 300 soldiers, drawn from the West Indian black regiments. The Church of England, which is the national church, has a hierarchy of one bishop, with a number of rectors and curates supported by the British Government, which also subsidises the Presbyterian and Catholic Churches. In 1891 about 38,000 children, or one-ninth of the whole population, were receiving regular instruction in the colonial schools. The annual budget usually balances itself, while the public debt amounted in 1890 to £200,000.

The colony is divided into the four administrative districts or counties of the North-West, Essequibo, Demerara, and Berbice.





CHAPTER III.

DUTCH GUIANA.



THE Dutch, who were the first settlers in British Guiana, laid the foundations of the prosperity of that colony to the benefit of their English rivals. What they have preserved of their old possessions is of far less value than what they have lost. Surinam, as they call their present colony of Guiana, has scarcely one-sixth of the population grouped round Demerara, in the British possessions, while its trade hardly amounts to one-fifth of the commercial transactions carried on by the neighbouring colony.

The economic crisis following the abolition of slavery in 1863 involved numerous plantations in utter ruin, and vast stretches of cultivated land reverted to the solitude of the savannas and woodlands. The population even decreased by emigration, and several years of decadence elapsed before the first symptoms of a slow revival became manifest. At present the population is on the increase, though this is due to the arrival of a few Indian coolies. The planters are gradually resuming possession of the land, but are for the most part devoting their attention to economic plants different from those cultivated by their predecessors.

As in British Guiana, the inhabited and cultivated zone forms but a small part of the whole territory. It comprises the coastlands between the outer belt of bush and mangrove swamps and the inland savannas. But even in this cultivated zone there are numerous gaps occupied by scrubby and marshy tracts.

NICKERIE—GRONINGEN.

Nickerie, the westernmost district, lying east of the Corentyne and its estuary, is but thinly settled, and the population is still very slight. At the beginning of the nineteenth century some planters and traders established a colony at the headland close to the confluence of the Corentyne with the River Nickerie on the right bank of the estuary. The site seemed favourable, and the settlement increased rapidly. But in less than two generations the very ground on which the quays and buildings had been erected was swept away by the Atlantic waves

continually encroaching on the land. The inhabitants, disheartened and compelled to retreat constantly towards the interior, at last dispersed, and nothing remained except a little group of cottages at the entrance of the estuary.

According to Palgrave, the rapid advance of the sea at this point is due to a subsidence of the land, and not, as the residents supposed, to a change in the direction of the winds and currents, giving more force to the breakers. This observer speaks of "a broad, triangular space of shallow water, lashed into seething waves by wind and current, where, a few feet under the surface, lies what was once the busy area of populous streets. Meanwhile the breakers, not content with the mischief already done, continue ceaselessly tearing away the adjoining land bit by bit. Right in front a large house, left an empty shell, without doors or window-frames, by its fugitive inhabitants, is on the point of sinking and disappearing among the waters that, unopposed, wash to and fro through the ground floor. Close by the victorious sea has invaded the gardens of the neighbouring dwellings, and will evidently soon take possession of the buildings themselves. Farther on a few isolated fragments of what was once a carefully constructed sea-dam rise like black specks among the yeasty waters, and the new earth-wall built to protect what yet remains of Nickerie has a desponding, makeshift look, as if aware that it will not have long to wait for its turn of demolition." *

Groningen, another colony of which its promoters had great expectations, has proved even a greater failure than Nickerie. It was founded in 1843 near the Saramacca estuary, and peopled with Frisians carefully chosen for the purpose of introducing "white labour" into these equatorial regions. But the enterprise met the fate that invariably overtakes all such experiments. Of the 384 settlers about one half were dead within six months, and most of the survivors had to remove to the neighbouring plantations. Several have prospered as artisans and gardeners in Paramaribo, but Groningen itself has all but disappeared. It stood about midway between Paramaribo and *Batavia*, which lies a few miles to the south-west on the right bank of the Coppename estuary.

Here is a lazaretto, where the patients are maintained by their friends and families. But the village lies too near the settled districts, and another leper-house is to be established on the right bank of the Upper Surinam in the uninhabited district of Grand Châtillon. Nowhere are the ravages of this loathsome malady more destructive than in Dutch Guiana, especially among the blacks and people of colour. In 1893 nearly a thousand were said to be tainted.

PARAMARIBO.

Unlike Georgetown and New Amsterdam, *Paramaribo*, capital of Dutch Guiana, does not lie on the sea coast. In this region the form and character of the seaboard has required the towns and settlements of the plantations to be established in the relatively dry zone, which is traversed by the coast streams flowing parallel with the strip of swampy mangrove-covered foreshore. Para-

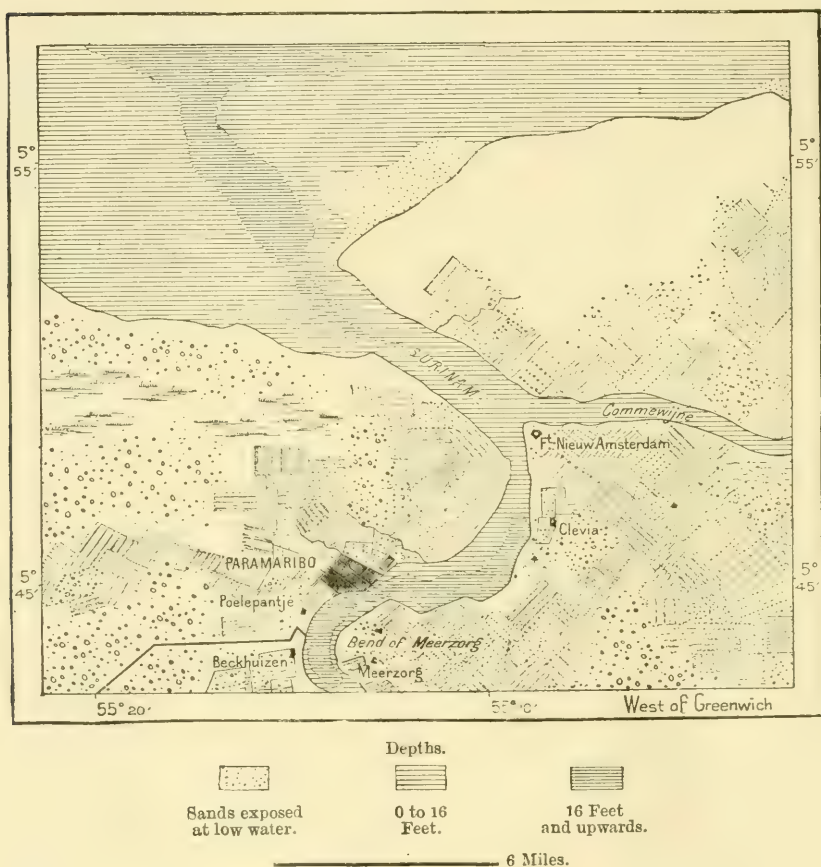
* *Dutch Guiana*, p. 17.

maribo is a French foundation dating from the year 1640, when some refugees from Cayenne built a little fortalice on the spot where now stands *Fort Zeelandia*, on the left bank of the Surinam just above its estuary. Ten years later Lord Willoughby of Parham raised the place to the dignity of a capital, and when it soon after passed into the hands of the Dutch, it became the administrative centre of their Surinam possessions.

Paramaribo, which is an Indian name and not a corruption of Parham, stands on a terrace of shingle, coral, and shells at the point where the river describes a

Fig. 16.—PARAMARIBO AND SURINAM ESTUARY.

Scale 1: 330,000.



curve round to the east before its junction with the Commewijne at the head of the estuary. It has the aspect of a tropical Amsterdam, and, despite the difference of materials, its wooden houses painted grey recall the more substantial brick structures of the Dutch city. Some Government buildings, such as the Government palace, the synagogue, and a few churches impart an air of importance to this somewhat old-fashioned town. Being well kept it is by no means an unhealthy place, although the atmosphere, unrefreshed by the sea breezes, somewhat resembles that of a hothouse in Kew Gardens.

Paramaribo is soon to be connected by rail with the fertile riverside districts in the Saramacca valley. The approaches from the sea are commanded by *Fort Nieuw Amsterdam*, which occupies a strategical position of vital importance at the Commewijne confluence in full view of the estuary.

EASTERN SETTLEMENTS.

East of Paramaribo the banks of the Commewijne and Cottica rivers were lined with an uninterrupted succession of gardens and plantations, which are now partly abandoned, while most of them have changed hands. Black descendants of the old slaves have become the owners of many a domain which at one time depended on some great Dutch landed estate. The village of *Sommelsdyk*, commanded by a pentagonal fort at the junction of the two streams, recalls the name of the famous Dutch governor, who was himself owner of one-third of all the colonial plantations.

Some 50 miles above Paramaribo on the Surinam river, are seen the ruins of a synagogue and of a group of cottages at a place called *Joeden Savane*, "Savanna of the Jews," which preserves the memory of the Portuguese and Leghorn Jews, who, after their expulsion from Pernambuco, took refuge in Guiana and established themselves on the banks of the Surinam in 1641. The white population is still largely composed of Israelites, who control the money market of Paramaribo, and supply the colony with most of its professional men—doctors, lawyers, and judges. During the eighteenth century these Semites had their own administration of justice, at least for all cases heard in the lower courts. During their religious feasts also they enjoyed the privilege of immunity from arrest or legal prosecution of any kind.

The left bank of the Maroni on the French frontier is very thinly peopled. Here the scattered groups of cabins nearly all belong either to the Galibi Indians or to the descendants of the Maroons, now universally known as Bush Negroes. The western streams are inhabited by a few communities of Bovianders, that is, half-breeds sprung from Dutch fathers and Indian mothers.

NATURAL RESOURCES.

During the slave period, sugar was the chief crop in Surinam, as in British Guiana. But the planters, unable to resist the crisis following on emancipation, abandoned most of their large estates; hence the colony even now possesses only a small number of sugar mills belonging to wealthy capitalists, who have provided them with plant and machinery as complete as those of the Georgetown factories. A single proprietor employs as many as 1,580 hands, negroes, Hindus, Javanese, and Chinese.

The cultivation of the coffee shrub, which had formerly acquired great importance, producing about 6,000 tons for the annual export trade, was neglected to such an extent that the colony had to import the coffee required for its own consumption. This industry, however, has been revived with fair prospects of permanent success since the year 1883, when some speculators introduced the

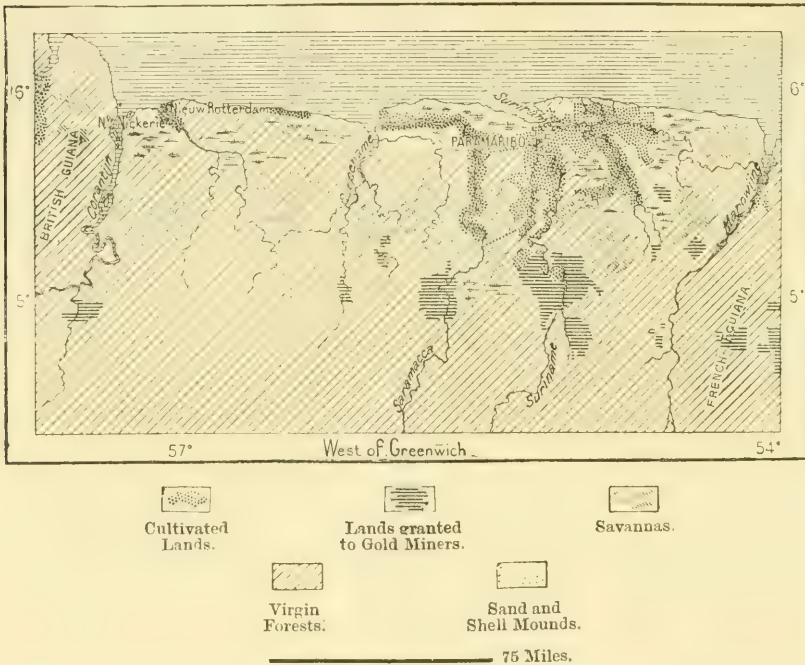
Liberian plant, which thrives admirably in the Surinam territory, better even than in Java itself.

In the north-western districts some attention has been paid to the *balata*, a plant which has been called the gutta-percha of Guiana. Cotton is no longer grown, being entirely supplanted by cacao, the staple product, the cultivation of which requires little care. Although the cacao tree produces nothing for eight or ten years, after that it yields a certain and regular harvest.

As a rule, the large plantations, whose products feed the export trade, enrich the country less than do the small holdings, in which the negroes and peasantry of various races raise provisions, vegetables, fruits, and especially bananas. An experiment in communism has been carried out on the *Onzerwacht* estate, which is

Fig. 17.—CULTIVATED ZONE, DUTCH GUIANA.

Scale 1 : 4,000,000.



jointly held by a colony of 300 negroes, engaged in husbandry and the lumber business.

In Dutch, as in British Guiana, the gold industry has lately acquired some importance. Diggings had already been carried on for some 20 years in the French territory, when the Dutch Government had the affluents of the Maroni explored, and here the precious metal was discovered by the prospector, Alma, in 1874. Since that time further discoveries have been made in the upper valleys of all the rivers, and especially on the banks of the Awa, the tributary of the Maroni recently awarded to Holland.

The yearly yield of gold has steadily increased without having yet reached the sum of £160,000. At first the auriferous sands alone were washed; but

recently the miners have ascended the valleys, and have begun to attack the primitive rocks in which the mineral is embedded. Thus the mining industry has rapidly become one of the important branches of the colonial industry, which had hitherto been limited to a small number of products. With a view to the development of the gold-mines, a road 50 miles long has been opened between the Surinam and Maroni rivers.

ADMINISTRATION.

Despite certain empty parliamentary forms, the colonial government enjoys absolute authority. The governor, named by the Crown, is also president of the "House of Assembly," comprising 13 members, of whom he nominates four. The nine others, elected for six years, owe their nomination to notables enjoying an income of at least 40 florins.

The governor proposes, and, if he chooses, disposes. Should his advice be rejected, he puts in writing the reasons of his dissent from the delegates, whereupon the majority has to consider the matter settled.

Instruction is obligatory for all children between the ages of seven and twelve, and in 1887 nearly 5,400 pupils were attending the 48 public schools. The annual budget amounts to about £100,000.

Dutch Guiana is divided for administrative purposes into 16 districts with variable circumscriptions. But all decentralised or provincial administration can be no more than nominal in a country whose capital alone contains more than half of the entire population, excluding the Bush Negroes, who are not comprised in the census returns.

The German Government is said to entertain the idea of purchasing Dutch Guiana with the view of converting it into a penal settlement like that of French Guiana.





CHAPTER IV.

FRENCH GUIANA.

I.

FRENCH GUIANA PROPER.



HERE French Guiana increased by the addition of the contested region extending from its recognised frontiers southwards to the Araguari estuary, it would equal the British territory in superficial area; but in respect of population, trade, industry, political and social life, no comparison is possible between the two colonies.

Of all the French possessions beyond the seas not one has prospered less than Guiana. Its story cannot be told without a feeling of humiliation, and the example of this territory is usually chosen to show the incapacity of the French as a colonising people, as if the country had ever been a colony in the strict sense of the word.

No really spontaneous stream of immigration has ever been directed from France to Guiana ever since the sixteenth and seventeenth centuries, when some French freebooters, roving the seas, established a few ports of refuge or refitting stations at favourable points along the seaboard. All who, during the last 250 years, have landed on these shores between the Maroni and Oyapok estuaries, have come either as colonial officials and soldiers, or else in gangs of slaves and hired labourers, or even in convoys of criminals and convicts often of the worst type.

ESSAYS AT COLONISATION.

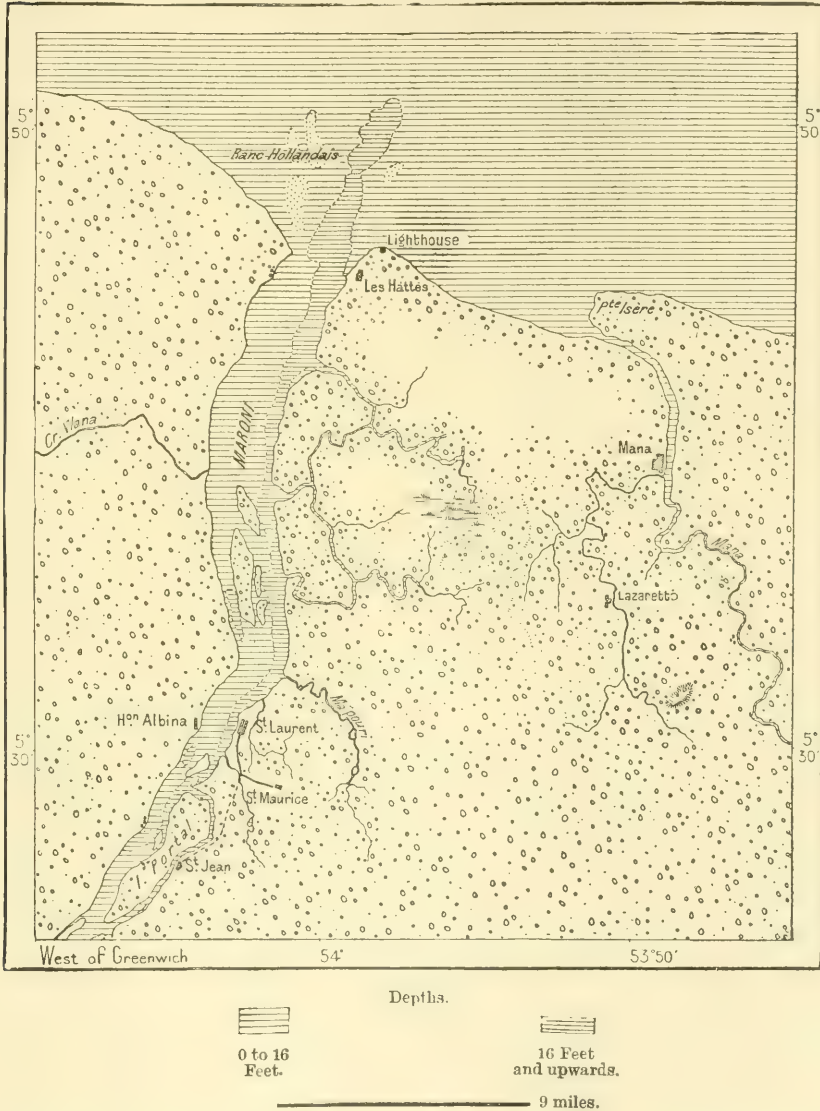
The country has never been quickened by the spirit of free colonisation. The very sites of the settlements were often selected beforehand by administrators who had never visited the colony. Impracticable decrees issued from Paris were carried out in a haphazard way; no preparations were made on the spot for the reception of the new arrivals, who consequently perished in thousands, camping without food or shelter on the banks of swampy creeks. Even those who had been more favoured by fortune, and who had obtained some cover and supplies,

succumbed at last to their hopeless plight "Feeling themselves forsaken by the whole world, they died through lack of will to live." *

All essays at compulsory colonisation having failed, it seemed natural to make choice of Guiana as a proper field of transportation for political enemies and as a convenient settlement for offenders against the common law. More

Fig. 18.—PENAL SETTLEMENTS ON THE MARONI.

Scale 1 : 450,000.



than once notoriously unhealthy districts were assigned to the exiles; tribunals which shirked the responsibility of pronouncing sentence of death were thus none the less able to call in its aid, and "the dry guillotine" became the popular name of Cayenne.

* Jules Itier, *Notes statistiques sur la Guyane française.*

Such a by-word easily enough explains the repugnance felt by all freemen for this region, which nevertheless is not cursed with the deadly climate attributed to French Guiana by the popular fancy since so many wretched victims of sentences of transportation began to be cast upon its shores.

The very failure of the frequent attempts to colonise the country had the natural consequence of causing much indecision in the plans of the central government, as well as in the activity of the local administrators. Few officials enter on their functions in Cayenne without forthwith yearning to return to their native land. Being merely "birds of passage," they can take but slight interest in a region which they hope soon to quit. But without attaching themselves to the land, they may perhaps be tempted to distinguish their administration by some ambitious scheme at variance with those of their predecessors in office, and calculated to enhance their reputation in high places.

Thus the affairs of the colony are managed in a shiftless way without a continuous policy, as needs must be in a territory which has seen thirty-four governors replace each other since the middle of the century. Hence whatever real progress is made in French Guiana, either in an increase of population or in the development of its natural resources, must be attributed, not to the administration, but to the slow ferment working spontaneously in the mass of the aboriginal elements increased by a few immigrants from Martinique, some Bush Negroes from Surinam, Portuguese and Brazilians from the conterminous regions. But on the other hand, the introduction of Hindu coolies has been made without system or humanity. Of 8,372 engaged in the prime of life, 4,522, more than half, perished within 22 years (1856-78), and of the whole number only 675 were restored to their native homes.

CONVICT STATIONS—MANA.

The basin of the copious River Maroni, which separates French from Dutch Guiana, is inhabited in its upper and middle course only by a few scattered groups of Indians, negroes, and gold-hunters. The first white settlements are seen some 38 miles above the estuary, and even these are nearly all occupied by convicts. Free colonisation in this district is represented only by a few plantations which were granted to some Algerian Arabs after their discharge from detention.

Saint-Jean, which lies farthest up the river, has the advantage of railway communication with the capital of the penal colony; but the surrounding district is marshy and unhealthy. *Saint-Laurent*, a little lower down, also on the right bank of the Maroni, is better situated, and here reside the directors of the penal station. The cabins of the Negro, Arab, and Annamite convicts occupy the sunny glades of a densely-wooded park not far from the cemetery.

Opposite Saint-Laurent stands the village of *Albina*, the only settlement founded by the Dutch on the left bank of the Maroni. In *Portal Island*, a little higher up, is situated the most important plantation in French Guiana, occupied mainly with the production of roucou.

The Mana river, which follows the Maroni in the direction of the east, has its little commune of *Mana*, named from the river, but the other coast streams, such as the Organebo, the Iracubo, and the Counamano, traverse almost uninhabited districts. Mana recalls some essays at colonisation, which were carried on with great vigour and perseverance. The enterprise was undertaken by a religious sister, Madame Javouhey, with a rare display of determination almost independently of Government control, although aided by the officials. With the help of the sisters of the community, of numerous hired labourers, and several hundred slaves, she founded various establishments, plantations, asylums, schools, a general hospital, and a lazaretto. The present village of Mana is regarded as one of the most salubrious in Guiana, and was formerly the "rice granary" of the whole colony.

SINNAMARI—KOUROU.

Sinnamari, originally a Dutch settlement, founded near the mouth of the river of like name, has become famous as a place of banishment. In 1797 and 1798, after the Royalist conspiracy of Fructidor, over five hundred suspected were transported to this place; of the 329 landed by the *Charente*, 171, more than half, rapidly succumbed to their hardships, despair, and disease. But far more disastrous had been the attempt made to colonise the district in 1763, when about 13,000 emigrants from Alsace, Lorraine, and Saintonge were landed on the banks of the Kourou, some thirty miles east of the Sinnamari.

France had just ceded Canada to England, and Choiseul, who with his cousin, de Praslin, at that time ruled the Monarchy, decided to replace the lost territory by calling Guiana "Equatorial France," and despatching thither fleet after fleet of colonists. Even some players were included for the purpose of amusing the future "Guianese" in their hours of relaxation. In memory of Canada they were provided with skates, but the provisions were forgotten, and no arrangements were made for landing and housing the settlers, while the Chevalier de Turgot, who had been appointed leader of the expedition, remained in France. Even during the voyage the unhappy victims were decimated by the plague, and on the banks of the Kourou famine carried off those spared by typhus. After at least 10,000 had perished miserably, a few hundred survivors at last succeeded in getting back to Saint-Jean d'Angely, the port from which they had sailed.* A coffee plantation belonging to the Government marks the spot where most of the "colonists" had succumbed to their miseries. A few critical remarks on the colonising genius of the promoters of this scheme cost Fréron six months in the Bastille.

Farther east the district about the Kourou estuary was also the scene of some colonising experiments. At present some convicts are engaged on the plantations; but the *Kourou* penitentiary is a mere dependency of the three *Salut Islands* belonging to the neighbouring penal establishment. *Saint-Joseph* and the *Ile Royale* form the convict station proper, reserved for dangerous subjects, or for

* J. Mourié, *la Guyane française*.

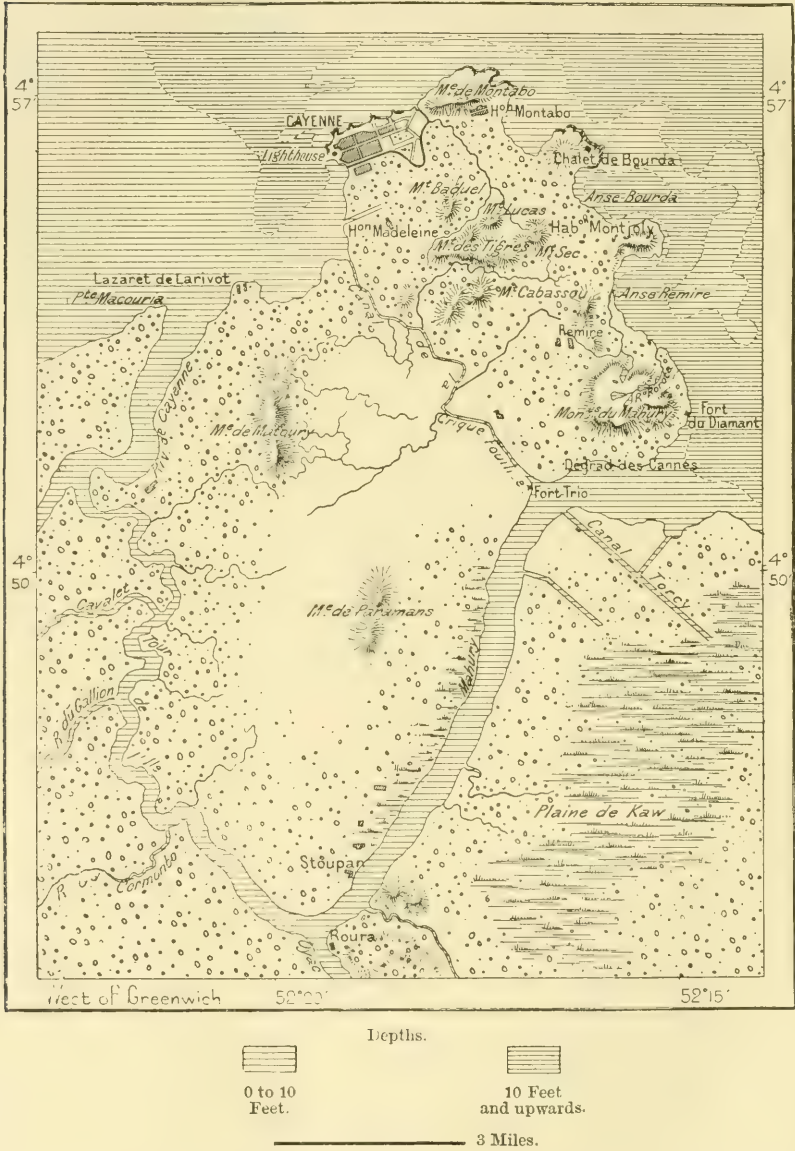
such as are placed under special control. Vessels of large size find good anchorage under the shelter of the Salut Islands.

CAYENNE.

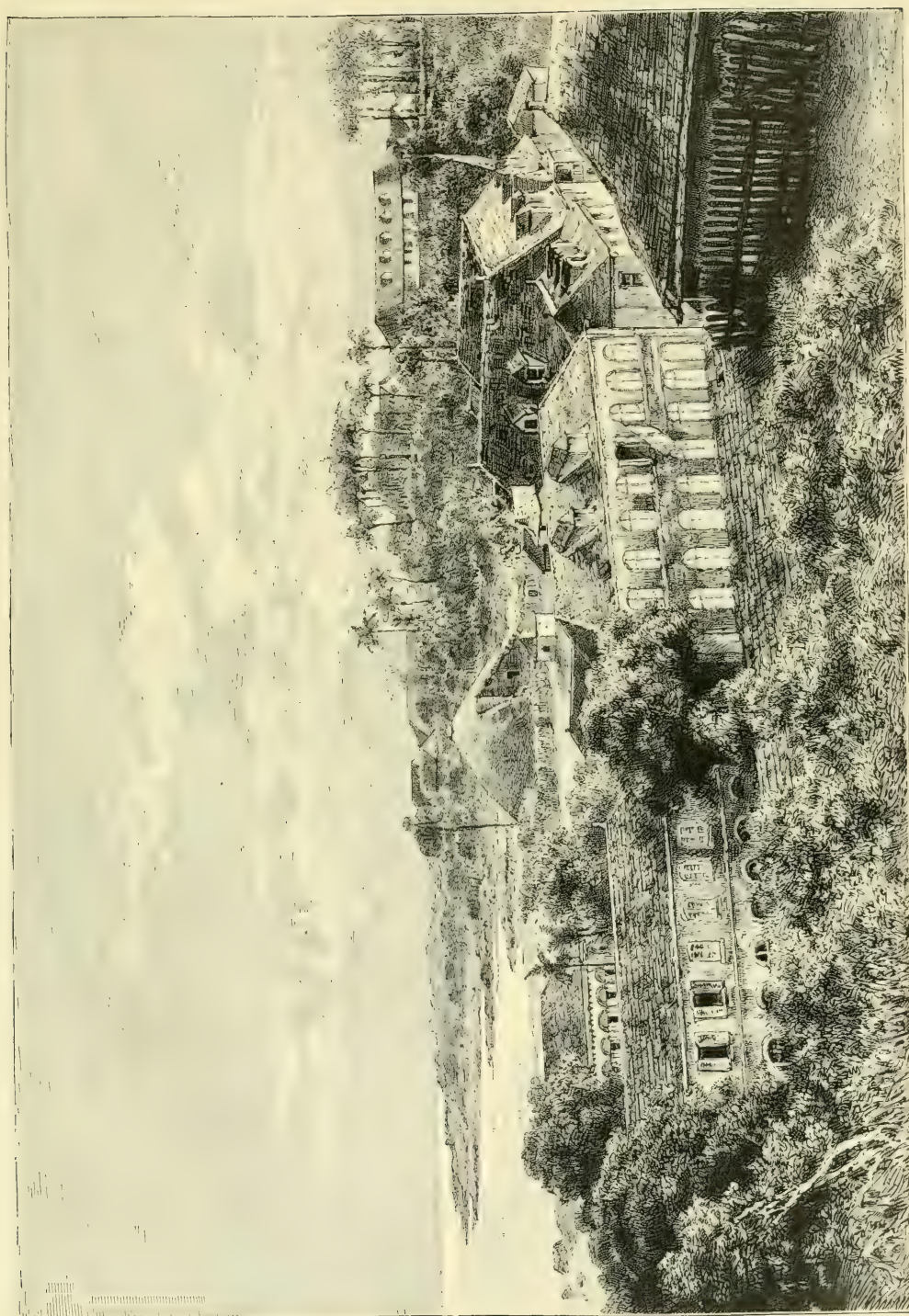
Cayenne, which appears to take its name from an old Indian chief, is one of the earliest settlements in Guiana. The island on which it stands was occupied

Fig. 19.—CAYENNE ISLAND.

Scale 1 : 200,000.



in 1604 by a party of Frenchmen under the leadership of the Norman, La Ravardière, who had been commissioned by a trading company of Rouen. The first immigrants, as well as the Dutch Jews and others who followed them, had



CAYENNE—VIEW TAKEN FROM CÉPEROU.

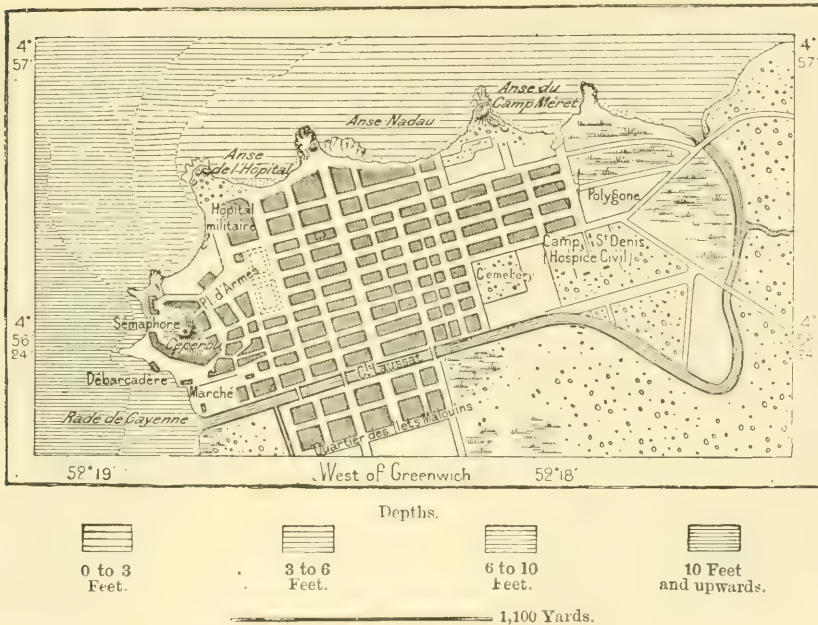
settled at the foot of the Remire Hills some distance to the east of the present town, which was founded at the little fort of *Saint-Louis*, but did not become the permanent capital of French Guiana till the year 1877.

Cayenne is comparatively speaking a large place, containing 10,000 inhabitants, or about one-third of the whole population of the colony. It is laid out in the usual American chessboard fashion, with streets at right angles and shady squares on a peninsular space at the foot of the verdant Céperou eminence at the north-west extremity of the island.

The administrative and Government buildings, hotels, barracks, and prisons occupy a large part of the town, which is encircled by parks and magnificent avenues of palm-trees. Being well exposed to the seabreeze, Cayenne would

Fig. 20.—CAYENNE.

Scale 1 : 30,000.



naturally enjoy a healthy climate but for the canals in the environs, which often get choked. A supply of water is brought by conduits from a neighbouring height fed by the Rorota rivulet. By far the greater part of the population consists of negroes, chiefly descendants of the freedmen who flocked to the place after the emancipation of 1848. But all the other races of the colony have their representatives in Cayenne. Most of the domestic servants are Creoles from Martinique; the booths and stores are chiefly in the hands of Chinese hucksters, while the fish markets are supplied by natives of Annam. The harbour is accessible to vessels drawing 14 feet, but it is partly exposed, and the shipping has occasionally been wrecked by high tides occurring in rough weather. A lighthouse has been erected on the *Enfant Perdu*, a rock at the northern entrance.

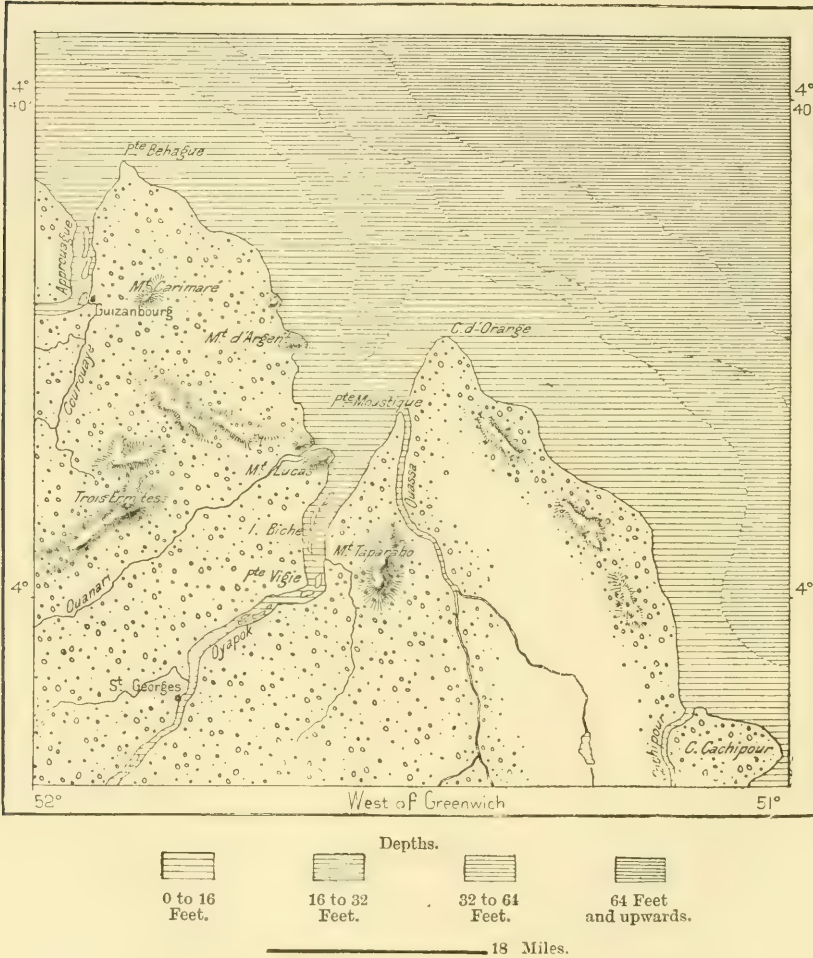
Formerly gardens and plantations abounded in the environs of Cayenne,

especially along the canals and in the eastern parts of the island. The Jesuits possessed rich coffee plantations at the foot of the Remire hill, and *Gabrielle*, on the mainland south-east of the capital, was even at one time famous for its spices. During the first years of the Restoration the cloves of this estate yielded a revenue of £16,000 in favourable years.

But at present all the old cultivated tracts have reverted to the state of bush, and nothing is now seen except here and there a few coffee and cacao shrubs run

Fig. 21.—MOUTH OF THE OYAPOK.

Scale 1 : 1,100,000.



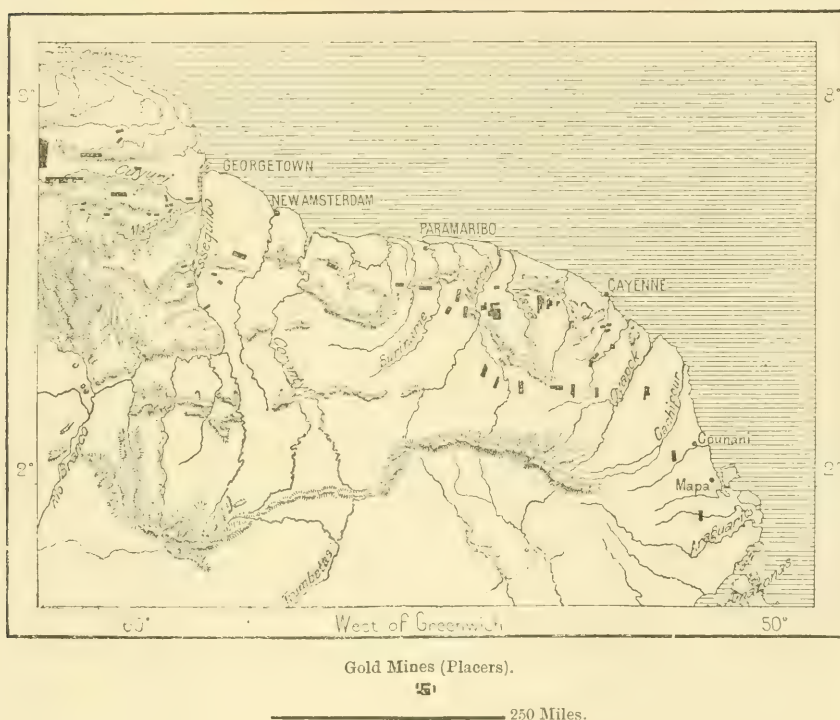
wild. The island is traversed by some carriage roads, one of which, 11 miles long, runs to the so-called *Dégrad des Canes*, a landing stage for the little steamer which plies on the Mahuri creek as far as the village of *Roura*. Farther on, that is, always to the windward of Cayenne, flows the *Kaw* river with a settlement of the same name, beyond which follows the *Approuague*, famous for its auriferous alluvia. It was in the valley of the *Aratai*, a western affluent of the *Approuague*, that gold was first discovered in this basin by a

Brazilian named Paulino in the year 1855. Since then both the Approuague and the Upper Maroni goldfields have yielded a continuous supply of the precious metal to the miners.

On the coast between the Approuague and Oyapok estuaries the so-called *Montagne d'Argent* ("Silver Mountain"), a little eminence 264 feet high, also recalls some old mining operations. Here an unhealthy penal settlement, which had to be abandoned, has been replaced by a coffee plantation. The *Montagne d'Argent* serves as a landmark to pilots making for the mouth of the Oyapok, present easterly limit of French Guiana. There are scarcely any settlements in the valley of this copious river, which has been thoroughly but unsuccessfully

Fig. 22.—GOLD MINES OF GUIANA.

Scale 1 : 13,000,000.



explored by prospectors. Nothing was found except a few particles along the banks of the stream.

NATURAL RESOURCES.—TRADE.

In French Guiana are found all the products of the tropical zone, but none in sufficient abundance to support a large export trade. In 1890, after half a century of agricultural decline, not more than 9,400 acres were under cultivation in the whole colony, and of these fully two-thirds were devoted to the production of provisions for the local consumption. Sugar, coffee, and cacao represent altogether a total annual crop of not more than 100 tons. The so-called *hattes* or *ménageries* (cattle farms, farmsteads), contain very few cattle, and in 1890 the

whole colony possessed only 218 weedy, badly-bred horses. Of horned cattle, which succeed best, there were over 6,000, and about the same number of pigs, besides those running wild in the woods. A few hundred sheep, goats, asses, and mules complete the list of livestock.

The industries, properly so-called, are in a rudimentary state, being limited to a few *tafia* (coarse rum) distilleries, some saw-mills, and other small establishments. The largest industrial operations are those connected with auriferous quartz-crushing. But the yield of gold has gradually fallen off since 1875. In that year the registered return rose to about 4,500 pounds, valued at £227,000, to which, perhaps, half as much more should be added for the pilferings at the works and for the gold smuggled abroad. The iron ores, which abound in some districts, have never been worked.

Despite certain statements to the contrary, the trade of French Guiana is certainly greater at present than it was before the Revolution. The yearly exchanges with the rest of the world average from £520,000 to £720,000. The imports greatly exceed the exports, most of the merchandise brought into the colony being destined for the convict stations and the garrisons, which produce nothing in return. At present the whole of the shipping falls below 100,000 tons, but it is steadily increasing, thanks to the greater facilities of communication enjoyed by steamers over sailing vessels. Cayenne is connected by a regular line of steamships with Martinique and France by the Surinam and Demerara route. Small steamers ply on the coast, and a telegraph line 200 miles long connects Cayenne with the Maroni.

ADMINISTRATION.

Although French Guiana possesses a general council of 16 elected members, of whom seven for Cayenne, and also nominates a deputy to the French Chambers, the population is too small and the army of officials too strongly organised for the absolute power of the governor to be checked by this initial measure of local representation. Under the direct orders of the governor are the military commander, the heads of the naval forces and of the marine, the director of the interior, the procurator-general, the head of the penitentiary department. All these functionaries constitute his privy council, to which, as a matter of form, are added three of the inhabitants whom he chooses, and whose vote he can always depend upon.

But even were the whole council in opposition, the governor might still defy them, and even manipulate the annual budget, not to say expel any refractory members. Except during the elections, the *Moniteur Officiel*, issued weekly, is the only journal in the Colony. In a word, the penitentiary system of administration may be said to mould civil society itself.

After the Coup d'Etat of 1851, the transportation system was introduced by special decree, and is now the sole motive for the maintenance of French rule in Guiana. The first convoy of condemned criminals arrived at the Salut Islands in 1852, and by the year 1867 over 18,000 had been despatched to the various

penitentiaries successively chosen in the territory. Being now replaced by New Caledonia as the chief penal colony, French Guiana receives only a part of the *récidivistes*, that is, those Europeans condemned to over eight years' transportation, and all the Arabs, Annamites, and negroes.

The four penitentiaries of Cayenne, the Salut Islands, Kourou, and the Maroni contain on an average from 3,000 to 4,000 inmates, who are for the most part employed on public works. But besides utilising them in this way, the administration of the penal settlements also lend them either gratuitously or for a small sum to the town of Cayenne, to the governor of the colony, and to private firms. Although the labour of a convict is rated at about two francs (1s. 8d.) a day, all accessories included, the charge per head usually varies from three to eight pence. But it may be asked, on the other hand, what is the real value of forced as compared with free labour? To judge from the state of the roads on which the convicts are constantly engaged, it must be concluded that their labour is almost worthless, at least in Guiana, despite the large number of hands employed. Thus by excluding free labourers, they retard rather than promote the material progress of the colony.

French Guiana proper, that is, the settled territory, has been divided into thirteen communes in the full enjoyment of civil rights, with an organisation analogous to those of the mother country and of the other colonies. Nevertheless all municipal privileges were suspended for three years, and only restored in 1892 under the reserved condition of the governor's intervention in the choice of certain communal functionaries. The only exception has been made in favour of the capital, which retains its full rights without any reserve.

The thirteen districts, to which must be added that of the penitentiaries on the banks of the Maroni, comprise scarcely the eighth part of the whole territory, or about 54,000 acres altogether. The unsettled inland region remains undivided.

II.

THE CONTESTED FRANCO-BRAZILIAN TERRITORY.

Officially the territory in dispute between France and Brazil would appear to comprise a space of at least 100,000 square miles. It forms a long zone stretching from the Atlantic to the Rio Branco, and limited northwards by the course of the Oyapok, the Tumuc-Humac Mountains with their western spurs, the course of the Araguari, and the equator.

The question, however, has no real importance, except so far as regards the contested coast district between the Oyapok and Araguari rivers. Farther west the whole valley of the Rio Branco has, beyond all doubt, become Brazilian in speech, social usages, political and commercial relations. The appropriation of this section by France would be equivalent to appropriating a slice of Brazil itself.

As to the intermediate regions, which have been traversed by the explorers Crevaux, Coudreau, and Barbosa Rodrigues, they are inhabited only by completely

independent Indian populations estimated by Coudreau at not more than 12,700 souls altogether.

The district really contested comprises a superficial area approximately estimated at that of 15 French departments, or, say, about 35,000 square miles. But even here the civilised inhabitants number no more than some 3,000, or 12 to the square mile.

DISPUTED FRONTIERS.

So early as the seventeenth century, these regions were already claimed both by France and Portugal; but there never could have been any doubt as to the southern frontier, which was too plainly indicated by the broad stream of the Amazons. *Fort Macapa*, on the very bank of the estuary near the equator, had been erected by the Portuguese in 1688, occupied by the French in 1797, and the same year recovered by the Portuguese. The Treaty of Utrecht, concluded in 1713, was intended to settle the question once for all, but instead of doing so, it further complicated matters, by fixing, as limit of the respective domains, a river which nobody knew anything about, and the very estuary of which had never been explored by any navigator.

It is still asked, What is this river Yapok or Vincent Pinzon which the Utrecht diplomatists, ignorant of the relations in America, had in mind when they drew up their rudimentary map? On the one hand, the Portuguese identified it, amid so many *Yapoks*, or "Great Rivers," on this coast, with that which falls into the sea between the Montagne d'Argent and Cape Orange. On the other, the French might assert that the true "Great River," Vincent Pinzon's "fresh-water sea," was certainly the Amazons itself, and, if not this, then the Araguari, as being the largest watercourse in the region north of the Amazons.

Whole libraries might be filled with the memoirs and diplomatic documents that have been published on this unsolvable question. Various commissions have been engaged interpreting the meaning of the Treaty of Utrecht, or in settling the problem by a definite decision, but all their suggestions have been rejected, and Brazil, heir of Portugal, still advances the original claim to the Oyapok as the common frontier. Nevertheless, she is willing to settle the matter by accepting the Carsevenne as her northern boundary in this direction.

But history is not formulated, it "makes itself," despite treaties and conventions. In 1836 the French established a station on *Lake Mapa*, in the heart of the disputed territory, and four years afterwards the Brazilians founded the military colony of *dom Pedro Segundo* on the left bank of the Araguari. A convention decided that the rival Powers should evacuate the district in litigation, and France accordingly abandoned the station of Mapa. But Brazil declined to withdraw from the occupied territory, and in 1860 even exercised political functions north of the Araguari as far as the Tartarugal.

The country, till recently a solitude, is being gradually settled; a few villages have been founded, and the inhabitants, mostly Brazilian deserters and fugitives, who might well be satisfied with unmolested independence, are now seeking to

escape from their political isolation. They have several times asked to be annexed to French Guiana, notably in the year 1883, when they were visited by the explorer Coudreau.

COUNANI.

At last the inhabitants of *Counani*, the chief village in the northern district under litigation, resolved in 1886 to set up for themselves; but after proclaiming their political autonomy they wanted a French president, and Paris was for a

Fig. 23.—MAPA AND CARAPAPORIS BAY.

Scale 1 : 650,000.



time entertained with the spectacle of a worthy geographer of Vanves suddenly transformed to the chief of a hitherto unknown State. This adventurer forthwith surrounded himself with a Court, summoned a Ministry to his aid, and instituted a national order, *l'Étoile de Counani* ("The Star of Counani"), with more commanders, grand-crosses, knights, and officers than the inhabitants of the capital of the republic. But his Government was short-lived; within a twelvemonth the president of the new political community was deposed by his Prime Minister, and nothing further was heard of the "independent State of Counani."

Meanwhile the question at issue is solving itself in a practical way. The district, till lately a wilderness without appreciable economic value, is already well known from the explorations of Coudreau, and its natural resources have awakened the cupidity of its northern and southern neighbours. The population, estimated at no more than 1,500 at the proclamation of the ephemeral republic, had increased twofold within the next six years, and the annual trade already amounts to £60,000.

The coast steamers, calling at all the ports around the South-American seaboard, have not yet made their appearance at any point between the Oyapok and Mapa estuaries; but a brisk trade is carried on by the so-called *tapouyes*, small craft so named from a local Indian tribe. These vessels, ranging from 5 to 15 tons, are all built by the natives, for in this respect the independent tribes are more industrious than the inhabitants of French Guiana. The little harbours of the estuaries, being obstructed by bars, are inaccessible to large vessels, although nature has here provided the best anchorage on the whole of the seaboard between the Orinoco and the Amazons. Such is the deep Carapaporis channel, which flows between Maraca Island and the mainland, and which at some former period approached nearer than at present to the Araguari estuary. This harbour of refuge in the midst of the dangerous waters exposed to the bores rushing up the neighbouring estuaries may yet become one of the most frequented roadsteads on the Atlantic coast.

The people of Counani have not yet begun to work the auriferous alluvia of their river valleys; but their extensive savannas enable them to raise large herds of cattle. According to Coudreau, as many as 18,000 oxen find good pasturage in the district between the Oyapok and the Araguari. Stock-breeding has even extended beyond the mainland to the hitherto unoccupied Maraca Island.

The fisheries also are very productive, the lakes teeming with the piracuru, which is cured for the markets of Cayenne and Para. The fishers also harpoon the manatees, capture turtles, and extract an excellent fish-glue from the machoiran. Rubber and other valuable gums are collected in the surrounding woodlands.

INHABITANTS.—RECENT PROGRESS.

About two-thirds of the inhabitants are of Brazilian origin, and consequently generally speak Portuguese; nevertheless, all understand the Creole-French of Cayenne, which has borrowed several Indian words. The remaining third consists of Portuguese, Martinique islanders, and French Creoles, besides the Indian half-breeds, who till recently were the exclusive inhabitants of the district. These are known by the collective name of Tapuyos, a word which in the Tupi or "general language" of Brazil has the meaning of "stranger," or "enemy." It is now commonly applied indifferently to all the sedentary Indians on the banks of the Amazons, and even to the half-castes of all races, whose mixed descent is betrayed by the colour of their skin.

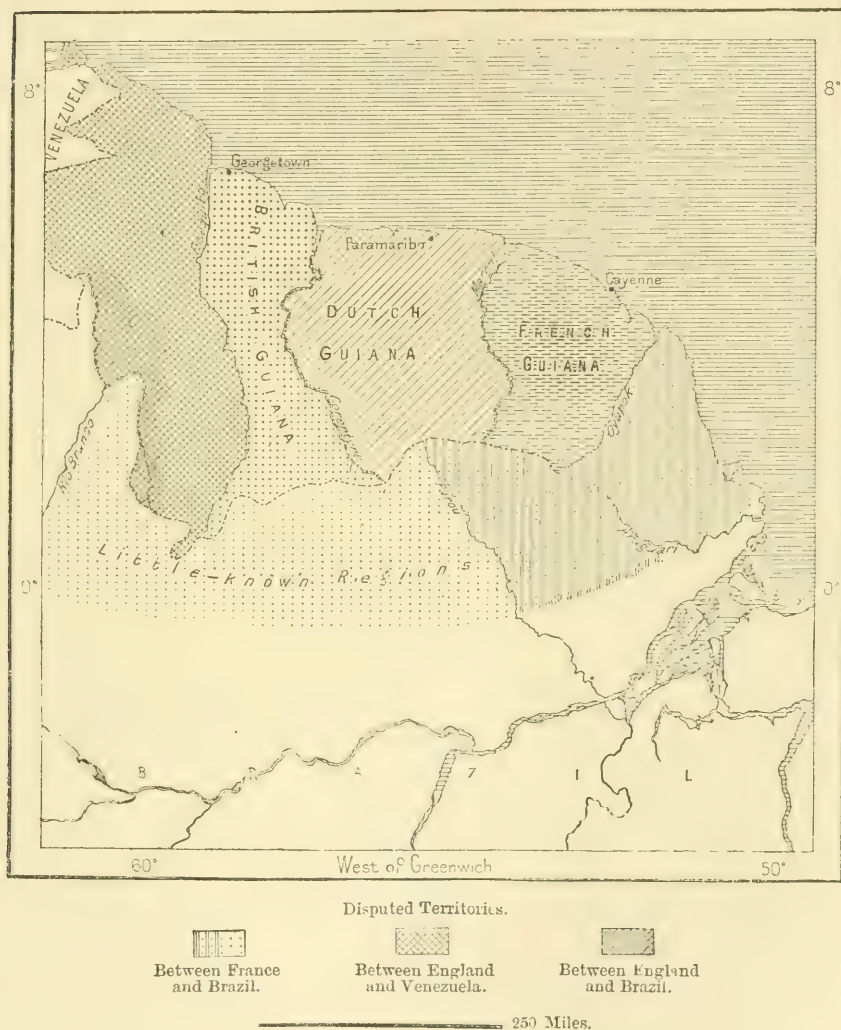
Political pressure is felt especially on the Brazilian side, where the military

station of *Pedro II.* serves as a support to the gradual occupation of the whole territory. Even the Apurima district, with its extensive savannas and live-stock farms, which stretch northwards beyond the Araguari about the Lago Novo, has become a simple administrative dependency of Macapa.

The Brazilians have encroached farther still in the direction of the Mapa river, where they have founded the colony of *Ferreira Gomes*. On the other hand, the

Fig. 24.—POLITICAL DIVISIONS OF GUIANA.

Scale 1 : 130,000,000.



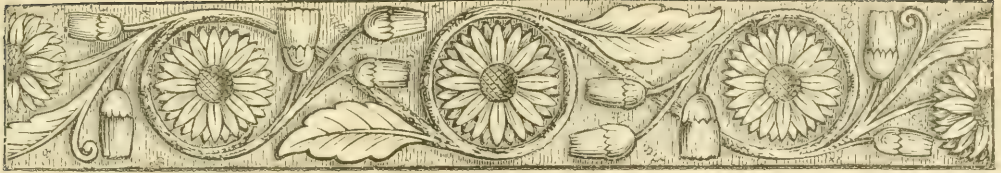
half-submerged lands traversed by the Ouassa and the Cachipour on the French Guiana frontier are amongst the least inhabited districts of the contested territory. Nevertheless, the trade of Counani and of Mapa tends to gravitate far more towards Cayenne than towards Para. This is due to the greater proximity of the French capital, as well as to its more accessible harbour. In the direction of

Para is developed the dangerous gulf of the "fresh-water sea," with its islands, currents, high tides, and bores.

In the northern basin of the Ouassa the three villages of *Rocaoua*, *Couripi*, and *Ouassa* are mere groups of huts round which roam the Palicour and Aroua Indians. Even the ranchos of *Cachipour* give shelter to scarcely more than a dozen families. The two already mentioned villages of *Counani* and *Mapa* are situated farther south. Mapa stands near the place where the French had erected their little fort in 1836, and has the advantage of lying nearest to the *Carapaporis* roadstead. Both of these villages contain a few wood and brick houses rising above the groups of palm-roofed huts. They have also each its school, and the intellectual and moral condition of the inhabitants differs little from that prevalent in the surrounding European settlements. In 1890 a service of steamers was established between Para and the mouth of the Mapa river, with an intermediate port of call at *Bailique Island* at the entrance of the Amazons estuary.

All these little centres of population have been constituted so many administrative "captainries," each with its "first captain," "second captain," and "brigadier," officials who are listened to when they have any personal worth, but whose orders are unheeded when displeasing to the citizens. In these microscopic communities unanimity alone may be said to have force of law. The officers themselves are nominated by acclamation in the public gatherings, and deposed by the same summary process.





CHAPTER V.

BRAZIL—GENERAL SURVEY.



BRAZIL unquestionably takes the foremost position in Latin America, and in extent it ranks as the fifth of the great States of the world, being exceeded only by the British Empire, Russia, China, and the United States.* In superficial area it nearly equals all the Hispano-American republics of South America, and scarcely yields to them in population.

In its form and general relief Brazil presents a sharp contrast to the Andine States, which are developed in a vast semicircle round her landward frontiers. The plateaux and crests of the uplands belong to an orographic system entirely different from that of the Cordilleras, forming, as it were, a continent within a continent. Between the two stretch the plains watered by the great rivers Amazons and Parana, with their multitudinous ramifications.

Being intersected by the equator, Brazil also differs from the conterminous regions in its higher temperature and more tropical nature. Only at its southernmost extremity does it penetrate into the temperate zone, which comprises not more than a thirteenth part of the total area. The mean elevation being much lower than that of the Andine States, the climate is proportionately warmer, and all the conditions of its flora, fauna, and inhabitants are correspondingly different.

Another contrast is derived from the relatively greater proximity of Brazil to the Old World. The shortest line between Europe and South America lies between Cape St. Vincent and the Brazilian headland of Cape S. Roque, while Pernambuco is nearer to Cadiz than is La Guaira or any other Venezuelan seaport.

GEOGRAPHICAL EXPLORATION.

The discovery of Brazil has been attributed to a certain João Ramalho, who died at San Paulo in 1580, after a pretended residence of ninety years in the country.

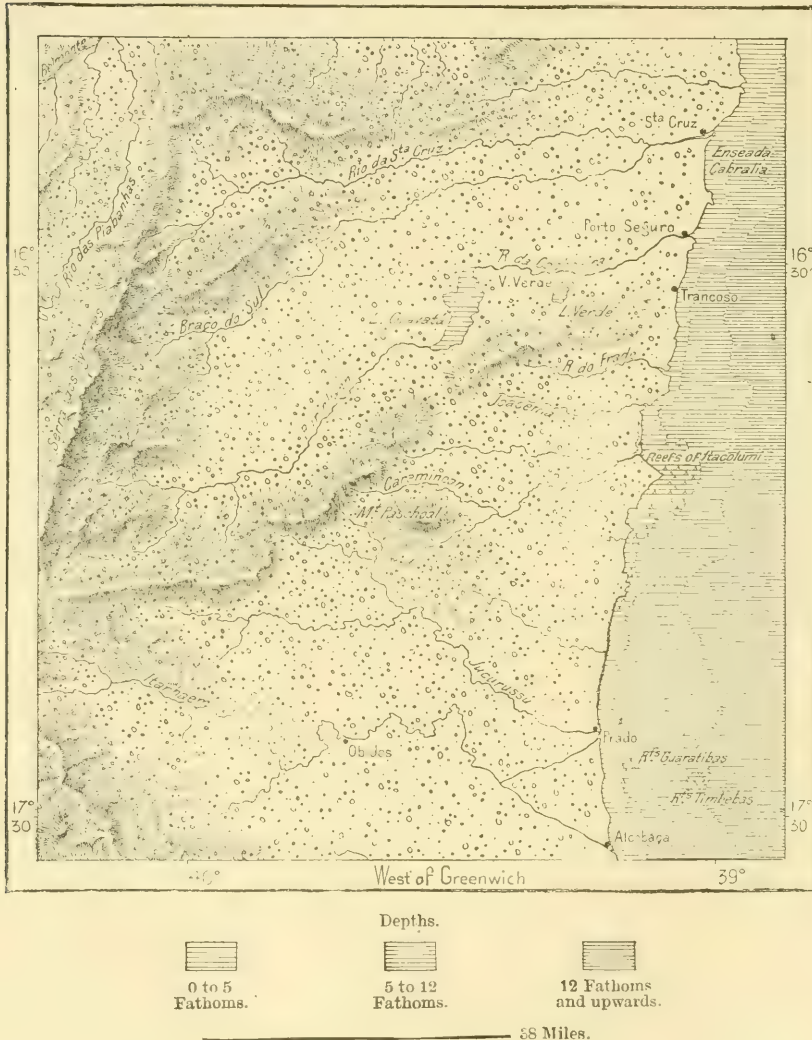
* Comparative extent of the great States of the world in 1893, excluding the Colonial empires, according to Wagner, Supan, and others :—

Russia, less the inland seas	8,000,000 square miles.
China with Mongolia, but exclusive of Tibet and Corea	3,800,000 „
United States with Alaska	3,550,000 „
Dominion of Canada with Labrador and the Archipelagoes	3,116,000 „
Brazil	3,070,000 „

But though history has forgotten this doubtful precursor of Columbus, the Brazilian seaboard was certainly sighted within eight years of the great navigator's first voyage by an expedition which had not been equipped for the New World at all. While Vicente Pinzon and Diego de Lepe were penetrating into the Amazons estuary, Pedr' Alvarez Cabral, bound for the East Indies, steered so far to the west that he struck land which he supposed to be an island. Here his vessels

Fig. 25.—LAND OF VERA CRUZ, SECTION OF BRAZILIAN COAST FIRST DISCOVERED.

Scale 1 : 500,000.



found a refuge in the haven which has preserved its original name of Porto Seguro. Taking possession of the place in the name of Portugal, he sailed away, leaving behind two criminals who were to learn the language of the country in order afterwards to act as interpreters.

On a cross erected near the port, Cabral had caused the arms of the King of

Portugal to be engraved, and Spain, unaware of the true character of this "island" of Vera Cruz, made no claim to its possession. In any case, it lay to the east, that is, to the Portuguese side of the line drawn by Pope Alexander VI. between the two halves of the globe assigned to Spain and Portugal.

But the "island" expanded with subsequent discoveries, and soon extended westwards beyond the conventional line laid down by the Treaty of Tordesillas in 1494 between the Spanish and Portuguese hemispheres. The name of Vera Cruz given to the land by Cabral, and afterwards changed to Santa Cruz, was not extended with the western discoveries, but remained restricted to a river and a settlement in the neighbourhood of Porto Seguro. The popular name of *Brazil*, previously applied to a mysterious land in which were supposed to grow the trees already known as *Brazil* or *Brasil*, at last became permanently attached to the new region, which thus took its name from the dyewood, not the dyewood from the country. Next year (1501), Andrea Gonçalves Amerigo Vespucci reached the bay of Todos os Santos, where now stands the city of Bahia.

PROGRESS OF PORTUGUESE SETTLEMENT.

Once revealed to the outer world, this seaboard received numerous visitors, amongst others de Gonville and other Dieppe navigators. By 1503 the Normans had already made several voyages, especially "in quest of the braisil, which is a wood for dyeing in red." In 1509 the whole seaboard had been explored as far as the Plate estuary, which was entered by Vicente Pizon and Diaz de Sols. A barter trade was opened with the natives, and in 1532, Martin Affonso de Souza founded the two colonies of S. Vicente and Piratininga in the present province of S. Paulo, and not far from the modern city of Santos.

Other groups of Portuguese established themselves at various points along the coast, and by the year 1534 the royal domain had already been divided into vast hereditary "captainries" granted to great lords with almost regal powers on the condition of introducing settlers and maintaining trade relations with the mother country. In order to consolidate his power and keep these great vassals in due control, King John III. created a government general for Brazil in 1549, with capital Salvador, the present Bahia, so named from the Bahia ("Bay") de Todos os Santos.

Colonisation continued to spread inland less by alliances with the natives than by conquest. Nevertheless, in 1549 the Jesuits had already penetrated inland to convert the Indians, and thus was begun the network of explorations which eventually brought them in peaceful contact with the Guarani of Paraguay, and with the Mojos and Chiquitos about the sources of the Madeira. But on the other hand the *Mamelucos* (*Membyruca*), white and Indian half-breeds of S. Paulo and the other captainries in the south, looked on the aborigines as mere slaves, and hunted them down like so much game.

North of Bahia also armed expeditions spread havoc along their line of march to the conquest of the boundless Amazonian regions. By the close of the sixteenth century Sergipe, North Parahyba, Natal, and the Cape S. Roque district had been

reduced; Ceara was occupied in 1610, and in 1616 the Portuguese had reached the Amazonian seaport of Para.

They had at the same time to defend themselves against foreign rivals eager to contend for a share in the vast Brazilian domain. In 1567 they recovered Rio de Janeiro Bay from the French, and here was founded the city which later became the capital of the whole region. In 1615 the French were also expelled from the island of Maranhão, east of the Amazons estuary; but the Dutch, after capturing

Fig. 26.—OLD POLITICAL DIVISIONS AND FRONTIERS OF BRAZIL.

Scale 1 : 52,000,000.



Salvador, held their ground for thirty years (1624—54) on the whole of the seaboard between the Rio S. Francisco and the Rio Grande do Norte, making Pernambuco their capital, and even reducing Ceara and Maranhão. Portugal being powerless to recover the lost territory, the natives themselves—whites, Indians, and blacks—rose against the Dutch, and after nine years of incessant warfare drove them from Pernambuco. Peace followed in 1661, after which Brazil remained exempt from any serious foreign invasion down to the present day. Rio

de Janeiro, however, was captured in 1711 by the French filibuster, Duguay-Trouin, who levied a heavy ransom on the inhabitants.

During the eighteenth century the Paulistas, that is, the people of S. Paulo, most enterprising of all the Brazilians, continued their excursions towards the Far West, whence they brought gold, diamonds, and other treasures. Stations were established at the mountain passes, at the entrance of the valleys, at the confluences of the rivers, and Goyaz and Matto Grosso were thus gradually annexed to the colony. The Paulistas even encroached on the Spanish domain, invading the "Missions" in the Parana and Paraguay basins, and extending their expeditions beyond the Mamoré to Bolivia and the Peruvian foot-hills. Thus was continually enlarged the domain of Portuguese speech, while the "buffer" zone separating the Brazilian uplands from the spurs of the Andes was gradually narrowed to the advantage of the Brazilian *sertanejos*. These pioneer squatters and backwoodsmen had explored, if not the whole course, at least the upper reaches and headwaters of the Amazons affluents, and the whole region began to assume a certain geographical unity.

POLITICAL RELATIONS.

After the rout of the Dutch, the sturdy Brazilians had many occasions of resisting the exactions of the Portuguese themselves, who came to be gradually regarded as *forasteiros* ("foreigners," "aliens"). About the beginning of the eighteenth century, several risings took place with varying success in the provinces of S. Paulo, Minas Geraes, and Pernambuco; but after the North American revolution, the national movements become more serious, and the year 1789 witnessed the defeat of the first republican conspiracy in Brazil; followed by the execution of Tiradentes, one of the chief conspirators, in 1792, the date chosen by the Brazilians as the starting-point of their new national era.

Although the Portuguese rule was maintained some years longer, the prince regent Dom João, on escaping from Portugal to Brazil, had to make Rio de Janeiro the capital of the Monarchy. Brazil itself took the title of a kingdom, and distant Portugal began to be regarded as a dependency of its former colony. In 1817 a republican insurrection broke out in Pernambuco, and in 1821 the Brazilian *Cortes* ("Chambers") opposed the departure of Dom João VI. for Portugal. Although the deputies were dispersed at the point of the bayonet, the regent Dom Pedro had next year to choose between the imperial throne of an independent Brazil or a return to Portugal. He chose the throne, and thus was accomplished almost without bloodshed the final severance of Brazil from the mother country.

Having thus become master of her own destinies, Brazil developed a marked individuality in strong contrast to that of the Spanish republics. Although Brazil, like the neighbouring States, contains hundreds of little-known independent tribes, her mixed white and Indian populations present more unity, a more complete fusion of the racial elements, than do the Hispano-American mestizoes. Most of the aborigines, to whatever stock they may belong, have also been merged

somewhat closely in a single family by the adoption of the *lingua geral* ("general language") as the common medium of intercourse.

THE SLAVE QUESTION.

A still greater contrast is presented by the African element, which enters in far greater proportion into the constituents of the Lusitano-American than into

Fig. 27.—BRAZIL AND PORTUGAL.

Scale 1 : 88,000,000.



those of the Hispano-American populations. Owing to the proximity of the Guinea coastlands, slaves were imported by the million into the Brazilian plantations, and although the majority call themselves "white," the Brazilian nation, viewed as a whole, must certainly be called mixed. In any case, even the full-blood negroes are regarded as equals by their white fellow-citizens.

Yet of all cultured nations Brazil had longest maintained the institution of slavery; even the slave trade was legally carried on till 1826, and then abolished

only under the pressure of the British Government. Nor was the convention observed, and the traffic continued, despite the English cruisers, and despite the "Aberdeen Act" of 1845, claiming the right of pursuing and capturing slavers in the Brazilian harbours. From 50,000 to 80,000 continued to be annually smuggled in down to the middle of the century, and as many as 1,500,000 are estimated to have been imported between 1826 and 1851, when the Brazilian Government was compelled by public opinion to place the slave trade on the same level as piracy. In 1851 the servile population was estimated at 2,200,000, but owing to the excessive mortality of the blacks, and the cessation of the import trade, they had fallen to 1,500,000 in 1871.

Public opinion still continued to demand the abolition of slavery itself. In 1866 the Benedictine monasteries liberated their 1,600 blacks, and the good example was followed by the hospitals and other institutions. At last in 1871 was passed the law of progressive emancipation, which aimed at the total extinction of slavery in a single generation. The same law summarily liberated all the slaves of the State, of the Crown, and of intestate estates, and this was followed by the final abolition of slavery in 1888, the very year in which Brazil effected an almost bloodless political revolution, changing the form of government from an empire to a federal republic. The emancipation affected 740,000 blacks, so that in twenty years their number had been reduced by one-half.

But if servitude has disappeared, the system of large landed estates persists. This is at present the chief factor in the social life of Brazil; it has given an immense impulse to free immigration and to the importation of hired labourers.

BRAZIL AND THE UNITED STATES.

In many respects Brazil, the "South American Union," may be compared with the North American Union. In their geographical aspect both regions present a curious resemblance, each occupying the central parts of symmetrical continents watered by river systems of prodigious extent. The relief also is much the same, somewhat narrow parallel coastranges on the east side, traversed or flanked on the west by the great backbone of the New World.

Even their history presents striking analogies, despite the difference of origin, Latin on one side, Anglo-Saxon on the other, and despite the slighter industrial and intellectual development of Brazil. In both regions the whites found themselves originally face to face with the aborigines, who were relentlessly pressed farther and farther inland. In both slave labour was imported to clear the ground and work the plantations, and in both has been developed an aristocracy of planters, whose power rests on the exploitation, almost on the monopoly of a small number of agricultural products.

The two great Powers of North and South have also had their frontier wars, the United States with Mexico, Brazil with the southern neighbours, and in 1893 the latter was still wrangling diplomatically over boundary questions.

RECENT EVENTS.

In 1680 the Portuguese had already founded the city of Sacramento, on the right bank of the Plate river, where now stands the old Portuguese "colony" of Colonia. For nearly a century the two rival Powers contended for this important station, which eventually remained with the Spaniards. The period of transition following the revolution of Buenos Aires and the rising of the Creole population enabled the Portuguese to recover the Banda Oriental, a territory which has now become the republic of Uruguay, and for some years Brazil remained in possession of the whole of the "Cis-Platine" province. But the

Fig. 28.—COLONIA DEL SACRAMENTO.

Scale 1 : 950,000.



inhabitants, nearly all of Spanish descent and speech, soon rose against the rule of the Lusitanians, and after a war of three years, in which they were joined by the Buenos Aires people, they achieved their independence. Since then (1828) Uruguay has preserved its autonomy, thanks to the natural rivalries of its two powerful northern and southern neighbours.

In the south-west the Brazilians became involved in other conflicts, here contending not for the natural frontier formed by the Paraguay-Parana confluence but for the maintenance of their present frontiers, and to prevent the preponderance of Paraguay, which, under the dictatorship of Solano Lopez, threatened

to upset the balance of power in the Plate regions. The five years' war (1865—70), in which Argentina and Uruguay sided with Brazil, was one of the most sanguinary ever waged. Paraguay was transformed to a citadel surrounded by a circle of fire and sword, which was gradually narrowed, till the whole nation had well-nigh perished.

Foreign wars were accompanied or followed by intestine strife, the province of Rio Grande do Sul often rising in revolt, and even constituting itself an independent republic which held its ground from 1835 to 1840. Here the peoples of Spanish descent are more numerous than elsewhere in Brazil, while their usages and commercial relations attract them to the centres of trade in the Plate regions.

Still more serious internal convulsions have recently broken out, and a civil war, which was fortunately brought to a sudden close in the spring of 1894, seemed for a moment to threaten the very stability of the State, if not the overthrow of republican institutions and the restoration of the Monarchy. In the autumn of 1893 the insurgents, having secured the adhesion of the navy, found themselves strong enough to occupy several strategical points in the Bay of Rio de Janeiro, and even repeatedly to bombard the capital itself.

ETHNICAL ELEMENTS.

Till recent times Portugal had maintained a certain ascendancy in its former colony, if not by its trade and industries, at all events through the immigration of the labouring classes. Every year a few thousands in the prime of life came from the banks of the Douro and Minho, or from Madeira and the Azores, to strengthen the Lusitanian element in the Brazilian towns and rural districts. The islanders are generally known by the name of *Angicos*, from Angra, former capital of the Azores, and from them are also perhaps named numerous places in Brazil, such as Angical and Arraial dos Angicos. Thanks to their common speech and usages, these Portuguese immigrants readily adapted themselves to the new environment, and rapidly merged in the surrounding populations.

Next to the Portuguese the Germans were the most numerous settlers, introduced at first as hired labourers, and afterwards as free immigrants. Those engaged by speculators for the plantations of Amazonia and of the Mucury basin perished wholesale of famine and hardships of all kinds. But the settlers in the temperate regions of Santa Catharina and Rio Grande do Sul thrived so well that their patriotic fellow-countrymen began to believe in the birth of a "New Germany" between the Uruguay and Brazil.

But although many grew wealthy, and for a time almost maintained a State within a State, their national cohesion has already been broken by the stream of Italian immigration, which has begun to overflow into every part of Brazil, and especially into the southern provinces. The influence of other white peoples—French, English, and North Americans—is felt not by their numbers, but by their enterprising spirit displayed in every branch of trade and industry.

Under the Dutch rule the Jews became powerful in Pernambuco, and although

they were afterwards persecuted by the Inquisition, burnt by the hundred, and compelled to abjure their national religion, they are now returning in greater numbers than ever, especially from Germany and Russia. The gypsies, descendants of those transported by Portugal to Brazil about the middle of the eighteenth century, still wander in small groups over the inland plateaux, while the Chinese have begun to make their appearance in the towns and on the plantations.

In general the Brazilians have not degenerated physically, and on the plateaux they are distinguished by their tall stature, skill, and energy. Despite the frequent wars into which they have been dragged, they are not a bellicose people, but rather of peaceful disposition, patient and long-suffering. Although far from ambitious, they are endowed with considerable intelligence and, like the Hispano-Americans, are "a nation of orators."

Even in colonial times Brazil had produced numerous writers and independent thinkers, amongst others Antonio José de Silva, burnt by the Inquisition at Lisbon in 1739. José de Lacerda, the first explorer to penetrate far into the interior of equatorial Africa, was a Brazilian, as was also Gusmão, first of modern physicists to send up a balloon (1709).

MAIN PHYSICAL DIVISIONS.

Viewed as a whole, Brazil forms a geographical unit characterised by an almost insular mass of crystalline and archæan mountains disposed in the direction from north to south, steeply inclined towards the Atlantic Ocean, and developing broad plateaux between the fluvial slopes. But despite this general simplicity of structure the country is so vast that within its limits are still comprised several distinct physical divisions of great extent. Hence nearly all of its most distinguished explorers have been fain to confine themselves to a single region, or even to a single section, as, for instance, some particular river basin of that region. It will accordingly be convenient to spread the detailed description of Brazil over a number of separate chapters, in which may be summed up the special geographical and biological features of each physical division.

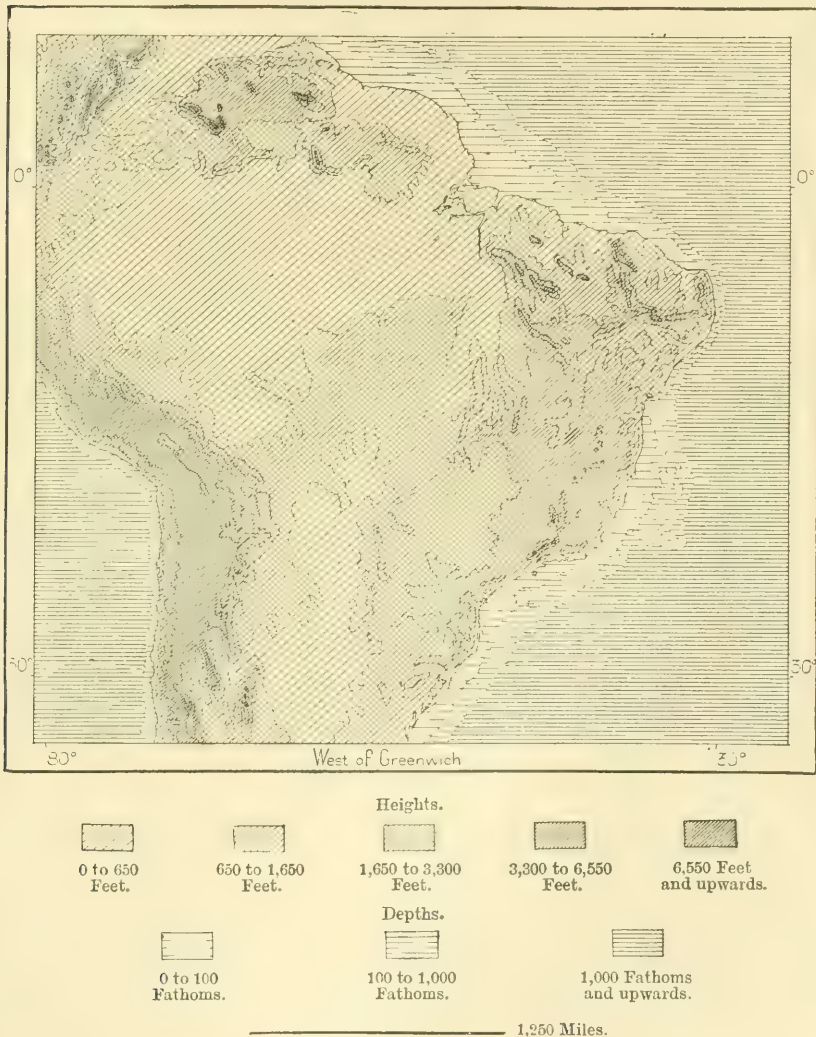
The natural limits of these physical divisions coincide in no way with those of the old administrative "provinces," which correspond with the States at present constituting the federal republic. In fact, these provinces had for the most part a purely artificial origin. They were carved by royal or ministerial caprice out of the coast region, and then extended inland in total ignorance of the configuration of the interior. These ancient "captainries," which varied from time to time in number and extent, have become the political and administrative divisions of East Brazil, while new provinces were afterwards created from the western territories, which stretched away to the unknown regions inhabited by independent wild tribes. Here, also, as on the seaboard, fictitious frontiers were traced on the map long before any knowledge had been acquired of the natural frontiers.

Amongst the broad physical divisions Amazonia alone comprises about one-half of the whole republic. It would even be doubled in size were it made to include all those parts of Venezuela, Colombia, Ecuador, Peru, and Bolivia which

belong to its basin on the inland slopes of the Andes. The great river which forms the central axis imparts to Amazonia an independent life, a world apart, with distinct natural features, products, and populations, and with a separate outlet towards Europe and North America. With the rest of Brazil its relations are still maintained, not by overland routes, but by this great waterway. All landward communication except in the south-east is prevented by the boundless

Fig. 29.—RELIEF OF BRAZIL.

Scale 1 : 500,000,000.



and tractless woodlands inhabited only by savage tribes. A direct overland journey from Manaos, capital of Amazonia, to Rio de Janeiro, capital of the republic, would resolve itself for half the route into a dangerous exploring expedition. A hostile fleet anchoring in the Amazons estuary would suffice to divide Brazil into two halves as distinct as France and Algeria. Hence it is not sur-

prising that the civilised populations dwelling on the banks of the great river have always submitted with reluctance to the Government of Rio de Janeiro.

Apart from Amazonia, the rest of Brazil is divided into natural divisions less clearly marked, although still offering some striking contrasts. The great oval space in which are developed the twin rivers Araguaya and Tocantins, and which about coincides with the State of Goyaz, constitutes one of these geographical regions skirted eastwards by the main central range, which runs north and south as far as the chief diverging point of the two fluvial systems.

The projecting seaboard at Pernambuco serves as limit to another region, which splits the great equatorial current into two streams flowing in inverse directions, and which separate the S. Francisco basin from the slope draining to the Amazons Gulf. Here are grouped the States of Maranhão, Piauhý, Ceara, Rio Grande do Norte, Parahyba, Pernambuco, and Alagoas, which, despite their proximity to the equator, enjoy a relatively salubrious climate, at least on the plains exposed to the sea breezes. They everywhere present the aspect of extensive plateaux or *sertões* of slight relief, thinly wooded, and inhabited mainly by stock-breeders, who suffer much from the periodical droughts.

Another natural division, including the two central and flourishing States of Bahia and Minas Geraes, comprises nearly the whole of the S. Francisco basin with some of the headwaters of the Parana. This may be regarded as the true central region of the country, not only in its geographical position, but also as regards its climate, flora, and inhabitants. The seaboard States following south from the lower S. Francisco—Sergipe, Bahia, Espirito Santo, Rio de Janeiro—constitute the outer slope of the basin traversed by the S. Francisco, and in these States are situated all the natural approaches, mountain passes, and river gorges leading from the Atlantic to that inner basin. This coast zone presents a more rapid seaward incline than that of the northern plateaux. The mountains are loftier and approach nearer to the sea; the rivers are more copious and swifter; the flora richer and more varied, thanks to the regular rains accompanying the trade winds. But the climate seems less healthy, although here lies the old capital, Bahia, one of the two largest cities in Brazil.

Rio de Janeiro, the modern capital, occupies a distinct zone sharply limited on the north by the deep Rio Parahyba valley. In the natural slope of the land and the direction of its rivers, this part of Brazil is connected with the plateaux of S. Paulo, although a large portion of its inhabitants has gravitated towards the Upper S. Francisco basin.

West of Minas Geraes and of Goyaz, the State of Matto Grosso, which comprises the water-parting between the Amazons and Plate basins, constitutes another physical zone, where the more open country, scattered clumps of trees, and wooded river banks contrast with the vast Amazonian forests and grassy plains of the plateau regions. Here the aborigines still hold their ground against the European and half-caste settlers.

On the other hand, South Brazil, traversed by the Parana, the Uruguay, and their affluents, has got rid of nearly all the indigenous tribes, and here Europeans

of pure stock are relatively far more numerous than in any other part of the republic. Here also the State of Rio Grande do Sul, often torn by civil strife, constitutes a separate geographical area, a peninsular region clearly delimited on the west and north by the course of the Uruguay. This State forms an intermediate zone between Brazil proper and the Plate River regions, although still differing greatly from the Argentine pampas in the inequalities of its relief, its arborescent vegetation, and the usages of its agricultural populations.

GEOGRAPHICAL NOMENCLATURE.

In the geographical nomenclature, names of Indian and especially of Tupi origin are scarcely less numerous than those introduced by the Portuguese settlers. Such native names have at least the advantage of generally conveying a clear meaning; most of them indicate some local peculiarity: the colour of the running waters, the height, form, or aspect of the mountains, the character of the vegetation or its absence. Recently a reaction has set in against the Portuguese and in favour of the Tupi terminology, and one result of the late political change was to impart a more Indian appearance to the maps. Such names as *Imperatriz*, *Príncipe Imperial*, &c., have been replaced by Tupi words which, if of less familiar aspect, possess more geographical interest.

The recurrence of favourite names is also extremely frequent, and every State has its Iguassu, its Parana Minim, its Chapada Grande, its Bom Jardim, and its Boa Vista. On the east coast there are no less than thirty-nine towns and villages named from St. John (S. João), besides many more in the interior. The villages usually take the title of *povoação*, while *aldeia*, the word employed in Portugal, is reserved in Brazil for the native villages. In Minas Geraes a common term for village is *arraial*, "camping-ground," due to the former gold-hunters, who formed temporary encampments in the auriferous districts.





CHAPTER VI.

AMAZONIA : STATES OF AMAZONAS AND PARA.



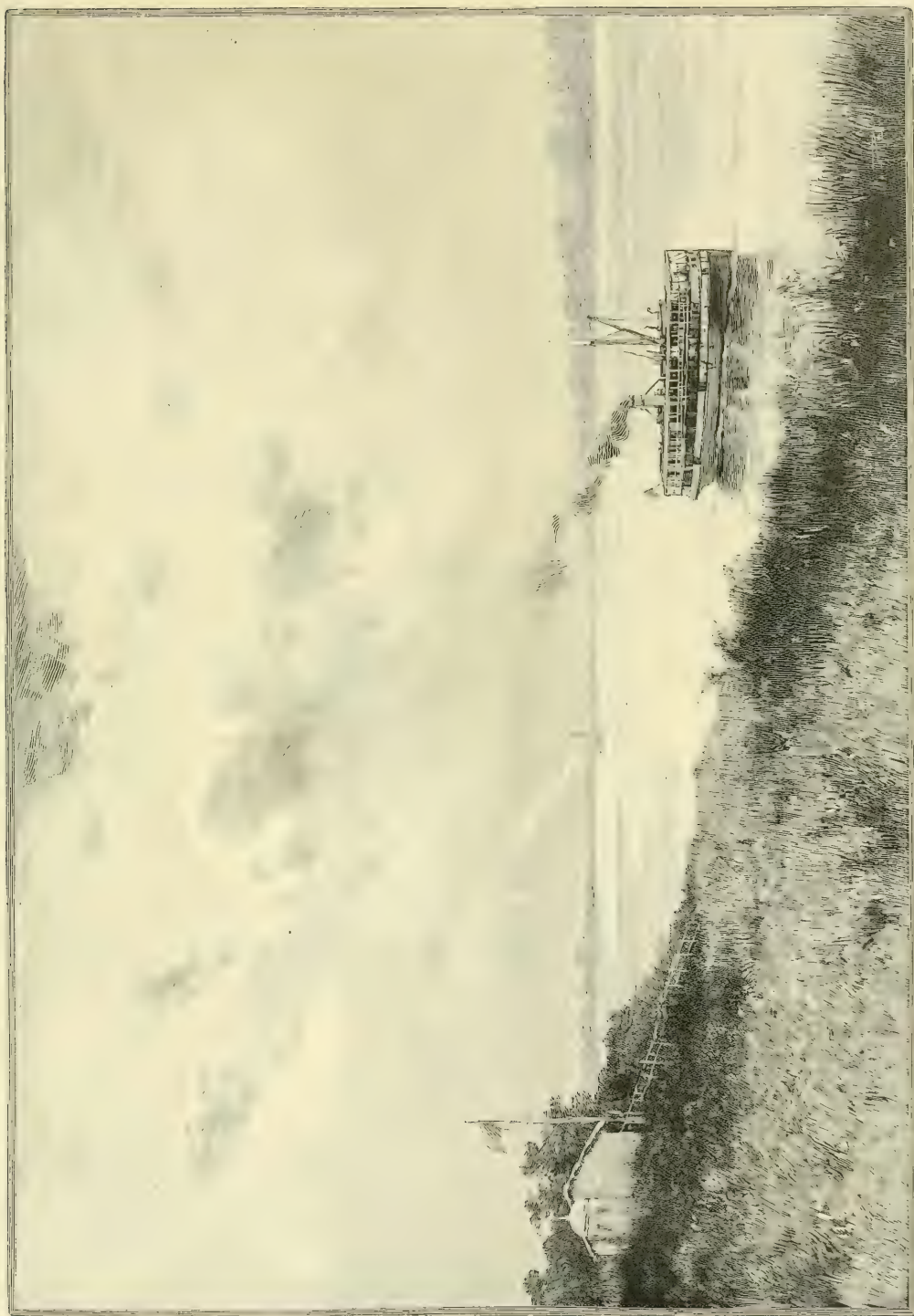
VEN when restricted to the section of the fluvial basin claimed by Brazil, the expression Amazonia covers a space about twelve times the size of the British Isles, but with a population, civilised and savage, of little over half a million. Politically it comprises the two States of Amazons and Para, although a portion of the latter lies beyond Amazonas proper. Even its capital, Belem or Para, is situated on a lateral channel east of the Amazons basin.

THE AMAZONS RIVER.

This river, most copious in South America and in the whole world, is already a great continental watercourse at the point where it enters Brazilian territory, at the foot of the Tabatinga cliffs. Between the Huanuco Andes and this place it has traversed a distance of 1,500 miles, flowing at first in its upland valley parallel with the Pacific coast, then through the *pongos* or gorges by which it escapes from the Andine regions, and lastly in a winding bed across the Maïnas plains. In this upper section it has been joined by several large affluents, such as the Chinchipe, the Paute, Morona, Pastaza, Huallaga, and Ucayali, this last draining the whole of South Peru. It has also received the Napo from Ecuador, and the Javary, which forms the political frontier between Peru and Brazil.

At the Javary confluence the volume of the Marañon (Upper Amazons) exceeds that of the largest river in Europe, yet it has still to traverse two-thirds of the continent at its broadest part, and to receive the contributions of such mighty streams as the Japura, the Purus, the Rio Negro, the Madeira, the Tapajoz, and the Xingu, beyond which it expands into a prodigious estuary before finally mingling its waters with those of the Atlantic.

During its long course from the Andes to the sea the great artery, which has everywhere a depth of at least 160 feet, changes its name three times. The Marañon, as it is called within the Peruvian frontier, becomes the Solimões, or Alto Amazonas, in the section between the Tabatinga and the Rio Negro confluence, beyond which, that is, throughout its lower course, it is specially known as



THE MARAÑON AT TABATINGA.

the Rio de las Amazonas. For the riverine Indians it was the Parana Tinga, "White River," the Parana Guassu, "Great River," or simply Para, "River" in a pre-eminent sense, a name now restricted to a lateral channel connected with the Amazons system. Lastly the Brazilians have conferred on their majestic stream the title of Rio Mar, "Sea River."

Before the days of steam the Amazons was seldom visited, and to the missionary Fritz (1690) is due the first chart of its course, rectified in 1749 by La Condamine. Then came in the present century the scientific explorations of Spix and Martius, of Castelnau, Herndon, Gibbon, Orton, Myers, Spruce, Wallace, Bates, de la Espada, Agassiz, Hartt, Barbosa Rodrigues, José da Costa Azevedo, and Tardy de Montravel.

On the Brazilian frontier, the Amazons flows at a level of not more than 270 feet above the sea; here it is nearly two miles wide and already presents the imposing aspect which it retains for the rest of its seaward journey. Several of the affluents themselves enter the main stream through mouths of enormous width. The waters of some are of the same yellowish colour as the Amazons itself, while others are of divers tints, clear and turbid, white or reddish, or even black, though limpid, each revealing a page of its geological history in its peculiar shade and in the sediment it holds in solution.

THE PUTUMAYO AND JAPURA.

The northern affluents descend from a zone only half as broad as that traversed by those from the south; hence their contributions, however copious, are in general much smaller than those of the southern streams. Nevertheless one of them, the Iça, that is, the Putumayo of the Colombians, would seem to be relatively the most voluminous; its headwaters, rising north and south of the equator, descend from the eastern slopes of the Quito highlands, which are exposed to heavy rains throughout the year. The Putumayo is one of those rivers which have most contributed to the erosion of the Andine system, reducing it in Ecuador to a comparatively narrow ridge between the broader Colombian and Peruvian masses. The Guames (Guamues), one of its head branches, issues from the Cocha, or "Lake," as it is called pre-eminently, and below its junction the Putumayo soon becomes accessible to barges drawing six or seven feet. It flows along a gentle incline unobstructed by reefs or rapids, at a sharp angle with the Amazons, and in Brazilian territory is known only by its Indian (Omagua) name, Iça. It was first visited by the Jesuit, Juan de Sosa, in 1609, and in recent times has been surveyed by Rafael Reyes (1874), Simson (1876), and Crevaux (1879). Like the Napo, the Japura, and other Ecuador tributaries, the Iça floats down much pumice from the slopes of the volcanoes, and this pumice accumulates in masses along all the chalk cliffs of the Amazons.

The Japura (Hyapura) rises a little north of the Putumayo in the Colombian Andes, and both streams flow in nearly parallel courses to a point where the Lower Japura trends directly east, joining the Amazons through a labyrinth of channels. Its incline is much greater than that of the Iça, and after issuing from

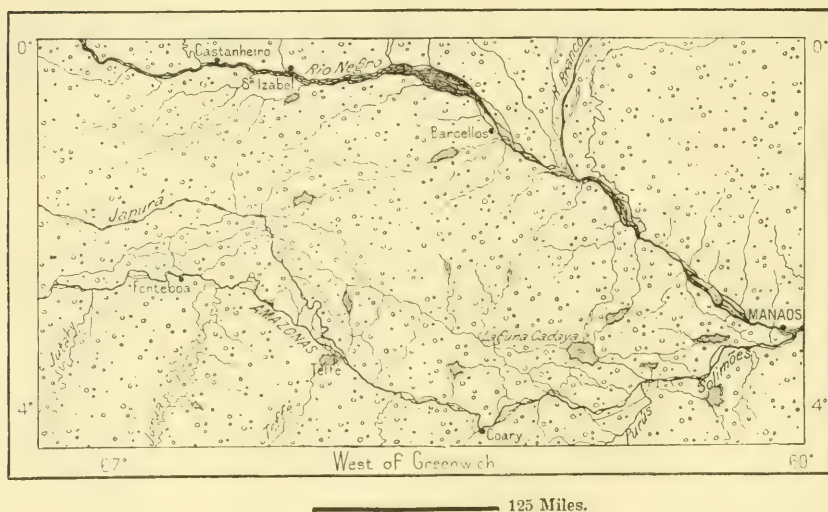
the Andes it plunges into the profound gorges of a sandstone plateau, where the current is contracted from a width of about half a mile to some 200 feet. The Araracoara rapids, followed by a cascade 100 feet high, mark the farthest point reached by Spix and Martius, and later by Silva Coutinho, and few travellers have yet succeeded in penetrating higher up.

The Apapuris, which joins the Japura below the rapids, is regarded by the Brazilians as the political frontier between their Amazonian territory and Colombia, whereas the Colombians claim as the international boundary the Avati Parana creek, which branches off from the left bank of the Solimões, and winds through a half-submerged district to the right bank of the Japura. Thus, in this part of its course the Amazons may be said to be a tributary of the Japura, by which 125 miles lower down it is joined through numerous channels.

Even beyond the confluence, for a space of at least 40,000 square miles, extend-

Fig. 30 —SOLIMÕES AND JAPURA CONFLUENCE.

Scale 1 : 8,500,000.



ing all the way to the Rio Negro, the region comprised between the two converging streams is occupied by an intricate system of lagoons, creeks, and backwaters, which shift their forms and channels with every inundation under the alternating pressure of the Solimões and Japura waters. If the Amazons basin was at one time an inland sea, as seems probable, its former aspect is best preserved in this half-lacustrine, half-emerged inter-fluvial district.

THE JUTAHY, JURUA, AND PURUS.

Between the Iça and the Japura confluences the Solimões is joined by several southern tributaries, such as the Jutahy (Hyutai) and the Jurua, which in any other region would be regarded as great rivers. In 1867 Chandless ascended the Jurua for a distance of 1,125 miles, including all the meanderings of its tortuous channel, and at the farthest point reached by him the stream was still some 30

feet deep and about 400 feet wide. Yet the Jurua ranks only as a third-class river in Brazil.

A little below its confluence the Solimões is joined by the Teffe, or "Deep," beyond which follow on the same right bank the black Coary and the Purus, the latter descending from the base of the Peruvian Andes. The Purus, essentially a river of the plains and entirely fed by rainwater, was ascended by Serafim for 1,300 miles in 1852, by Manoel Urbano in 1860, and in 1864—5 by Chandless, whose name has been given to one of its western affluents. The botanist, Wallis, accompanied the first steamer, which in 1862 reached a point 800 miles above the confluence.

Like all the other southern affluents of the Amazons, the Purus, which has an extremely winding course of about 1,850 miles, has a general north-easterly trend, and brings to the main stream the contributions of several large tributaries, such as the Araca, Hyuacu, Aquiry, Pauyarim, Mucuin, and Tapaua. It flows entirely in the old depression, which occupies the heart of the former Amazonian sea, and throughout its whole course it is entirely free from rapids or other obstructions; even islands are rare; but its numerous meanderings are constantly shifting their course owing to the erosions of the flood waters, which even a short distance above the confluence rise to a height of no less than 60 feet. Farther up the inundations fill its whole valley for a distance of 15 or even 20 miles, and at this season temporary branches are opened in the direction of the Amazons. But the channels figured on the old maps as communicating eastwards with the Madeira do not appear to have any real existence.

THE RIO NEGRO AND ITS AFFLUENTS.

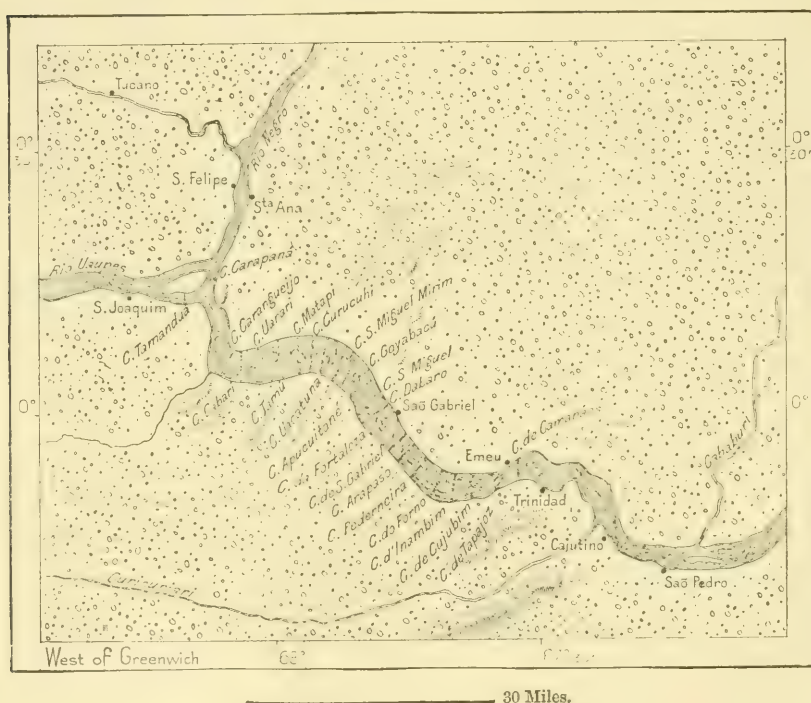
Between the Purus and Madeira confluences the Solimões becomes the Amazons by the junction of the Rio Negro ("Black River") on its left bank. Of the numerous watercourses bearing this name, none has a better claim to the epithet, and all travellers who have visited the Parana Pixuna, as the natives call it, have been struck by the contrast presented by the Rio Negro, especially at its confluence with the almost milky Rio Branco ("White River"), descending from the argillaceous savannas on the British Guiana frontier. The two currents flow side by side, like two streams in the same bed, and during the November floods, when the Rio Branco sends down a larger volume than the Rio Negro, it may be distinctly traced for a distance of some 20 miles below the confluence. It is noteworthy that mosquitoes do not infest the black rivers, which also abound less in fish and are often avoided by crocodiles, though these saurians frequent the Rio Negro. The water is limpid, but unpleasant to the taste, and apparently even unwholesome, owing to the decomposed vegetable matter with which it is charged, and to which it owes its dark colour. This colour, however, is perceptible only in the deeper parts, the shallow waters being of a light brown and even yellowish tint.

Of the numerous streams converging to form the Rio Negro the Rio Uaupes (Ucuyaris) seems to have the best right to be regarded as its true upper course

It has its source in the upland valleys of the Colombian Andes south of the Guaviare or Western Orinoco; its course follows the same direction as the main stream between San Joaquim and Barcellos; the beds of both rivers also present the same geological characters, while both descend to the lower reaches through a series of granite falls and rapids. Above the Jurupari, highest of these falls, the river, here as "white" as the Solimões and inhabited by the same species of fishes, traverses the level, treeless plains at the foot of the Andes. The Uaupes was ascended to its source by Jesuino Cordeiro in 1854, and since then its lower reaches have been visited by Wallace, Stradelli, and Coudreau, all of whom assert that its mean discharge greatly exceeds that of the Upper Rio Negro. During the floods

Fig. 31.—UAUPES CONFLUENCE AND RIO NEGRO CATARACS

Scale 1 : 1,500,000.



one of its affluents communicates through the Ira Parana with the Apapuris tributary of the Japura.

Above the Uaupes confluence the Rio Negro is connected by the Cassiquiare with the Orinoco system. Another less known and less important bifurcation occurs farther south, where the Baria ramifies into two branches, one of which flows north to the lower Cassiquiare, while the other descends directly to the Rio Negro under the name of Rio Canabury. A continuous waterway almost parallel with the Upper Rio Negro is thus developed in the direction of the east for a distance of about 300 miles, without, however, offering any advantage to the navigation by canoes at the divide.

Below the Cassiquiare confluence the Rio Negro enters Brazilian territory at

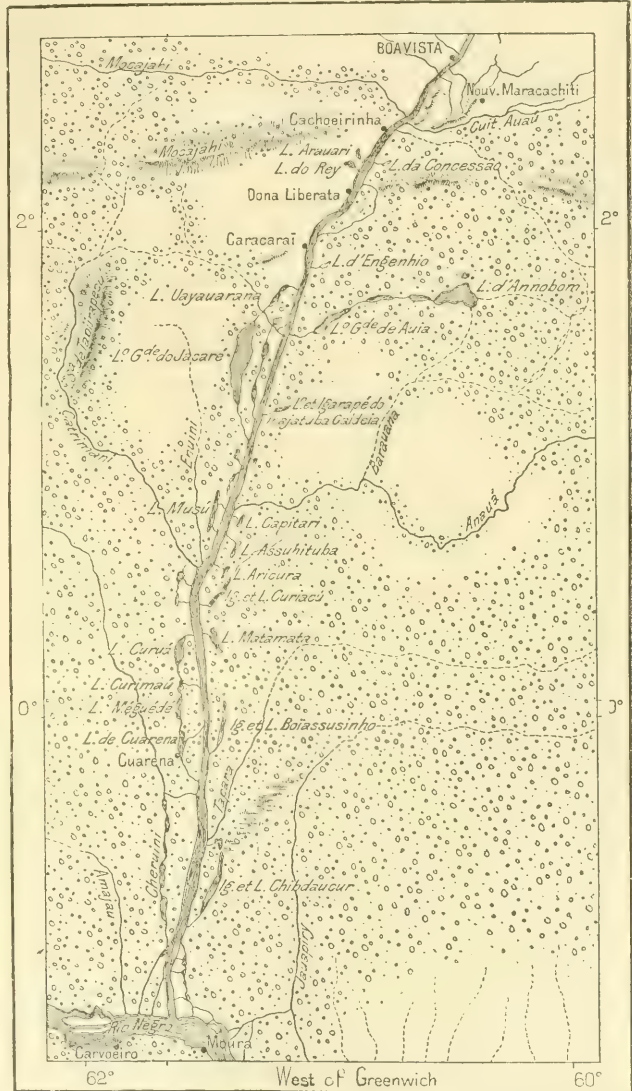
the foot of the "Cucuhy Rock," a superb granite bluff 1,000 feet high, visible for a great distance on the surrounding plains. After its junction with the Uaupes the mainstream trends eastwards between two chains of granite hills, which constitute the true water-parting between the Orinoco and Amazons systems. The rocky divide, which is continued north-eastwards to the Parima range, has been pierced at this point by the waters descending from the gently sloping northern plains. Geologically speaking, the parting line occurs, not at the bifurcation of the Cassiquiare, but at the breach effected by the running waters along the continuous series of cataracts, 50 on the Uaupes and 25 on the Rio Negro, cataracts which, despite their slight fall, present a picturesque effect with their projecting reefs, eddies, and swirling waters. The Rio Negro series has a total incline of not more than 50 feet in a distance of about 40 miles.

The Rio Branco ("White River"), which promises to acquire great importance as the most direct future highway between British Guiana and Central Amazonia, has been frequently ascended by the Portuguese. Recently a Venezuelo-Brazilian Frontier Commission has studied its upper valleys, but the surveys have been suspended owing to the hostility of the natives.

Like the Rio Negro, the Parima, as the Rio Branco was formerly called, has for its true upper course an affluent much longer and more copious than the branch commonly regarded as the chief headstream. This affluent, the Uraricoera, rises

Fig. 32.—LOWER COURSE OF THE RIO BRANCO.

Scale 1 : 3,500,000.



in an upland granitic valley of the Serra Parima, south of the Machiati peak, and after an easterly course of 360 miles joins the Takutu, or "Upper Rio Branco," which collects the torrents from Roraima and Cairrit, as well as the Pirara creek on the depression giving access to the Essequibo through its Rupunini affluent. The Mahu (Ireng), branch of the Takutu, is famous for its falls, one of which, the Corona, 160 feet high, ranks with Roraima and the Kaieteur Falls as one of the "three wonders" of British Guiana.

After receiving all these headstreams the Rio Branco trends south-westwards, and like the Uaupes and Rio Negro descends through a series of rapids which interrupt all navigation between the upper and lower reaches. Below these obstructions the Rio Branco flows in an almost due southerly course between a double chain of lagoons and backwaters, representing old abandoned beds, down to its confluence with the Rio Negro. The Jauapiry, which joins the main stream below the Rio Branco, appears to be a remnant of one of these deserted channels.

In its lower course the Rio Negro forms, like the Canadian rivers, a succession of lakes rather than a normal watercourse. In some places it expands to a width of 20 to 30 miles, far more than the Amazons itself, but the incline is so gentle that the current is at times scarcely perceptible, and towards the confluence the Amazons often sets up the Rio Negro, developing a sort of "bar," from which Manaos took its old name of "Barra do Rio Negro." The rise at high water ranges from about 30 to 40 feet, the ordinary depth being 100 or even 160 feet. Nevertheless navigation at low water is impeded by numerous sandbanks, and the small steamers, drawing no more than four and a half feet, which ascend to Santa Izabel, 450 miles above the confluence, have sometimes to stop running for one or two months in the year.

THE MADEIRA.

The Madeira, or "Wood" river, the Cayari ("White Water") of the natives, marks with the Rio Negro the great transverse depression of the Amazonian basin. It has its farthest sources on the Bolivian uplands, and on the nearly level low-lying plains, which are mostly drained by the Plate river. The Beni (Veni), its main headstream, which formerly received the overflow of Lake Titicaca, is joined within the Bolivian frontier by the copious Madre de Dios (Mayu-Tata, Amaru-Mayo, "Snake River"), and farther on by the Mamoré ("Mother of Men"), whose great tributary, the Guaporé, flows entirely within Brazilian territory.

The Guapay, or Rio Grande, that is, the upper course of the Mamoré, rises in the Cochabamba Andes at an altitude of over 13,000 feet, and after describing a great bend round those mountains is swollen by the waters of several rivers from the low-lying plains between the Bolivian and the Brazilian highlands. Its passage from the southern to the northern plains is here closed by a barrier of metamorphic gneiss rocks, which obstructs the current and develops a long series of falls and rapids. Formed by the junction of the Beni and Mamoré, the Madeira floats down large quantities of drift wood, whence the name given to it by its first explorer, Francisco Palheta, in 1723. Since that time it has served as the main highway between the Amazonian plains and the plateaux of Bolivia, and this



AMAZONIAN SCENERY—CACHOEIRA, NEAR MANAOS.

route has been followed by all recent explorers, such as D'Orbigny, Church, and Keller-Leuzinger. The hydrographic chart prepared in 1878 to a scale of $\frac{1}{100000}$ is based on the careful surveys of Selfridge.

From the Guajara Guassu Falls on the Mamoré to the last cataracts of Santo Antonio the total incline scarcely exceeds 200 feet in a distance of about 240 miles. The highest cascade, that of Ribeirão, some 12 miles below the Beni, has a drop of 40 feet, the 45 others varying from 30 feet to a few inches; but the whole system presents so many difficulties to the navigation that the native boatmen take from two to three months to make the ascent from the lower to the upper reaches.

Below these obstructions the Madeira flows mainly north-east parallel to the Purus with a uniform, though somewhat rapid current, which is nowhere less than 16 feet deep at low water, and in some places exceeds 500 feet, with a total mean discharge of no less than 1,400,000 cubic feet per second. It enters the Amazons through numerous island-studded channels, and throws off one branch, the Parana Mirim ("Little River") which joins the main stream about 190 miles lower down, thus enclosing the vast island of Tupinambaramas.

THE TROMBETAS, TAPAJÓZ, AND XINGU.

Beyond the Madeira confluence the largest affluent on the north side is the Trombetas, which collects the surface waters of the savannas, and on its course to the Amazons develops a ramifying lake due to the alluvial matter deposited by the mainstream about the confluence. Higher up similar phenomena are presented by the Urubu, Uatuma, Yamunda (Neamunda or Cumery), all carefully explored by Barbosa Rodrigues. Farther down the Paru and the Jary, which descend from the Tumuc-Humac Mountains, have a more regular course, freer from stagnant waters, but obstructed at intervals by rapids and even by cascades. Crevaux descended the Jary and the Paru in 1877-79 at the risk of his life.

On the south side the Amazons is joined below the Madeira by the Tapajóz, so called from the Tapajocos Indians, who have been completely exterminated by the Portuguese. Its two headstreams, the Arinos and the Juruena, rise in Matto Grosso, near the sources of the Paraguay, and after their junction the Tapajóz flows parallel with the Madeira north-eastwards to the scarp of the plateau. Here it is obstructed by a series of 16 cataracts, beyond which it forms a broad navigable watercourse, flowing between wooded banks for 300 miles to a point where the navigation is again interrupted by the Salto Augusto, the only cascade which is impassable at all seasons.

For the rest of its course of 220 miles the Tapajóz forms a sluggish stream nearly as dark as the Rio Negro, which gradually expands into a broad lagoon with scarcely perceptible current. Like that of the Trombetas, Lake Villafranca, as this flooded depression is called, owes its existence to the sedimentary matter deposited by the Amazons at the confluence. The Tapajóz presents the shortest natural route between the Amazons and Plate estuaries.

The Xingu, last great affluent of the Amazons proper, rises on the same

plateau as the Tapajoz, and, like it, is obstructed by a series of reefs and rapids, inaccessible to boats. Although visited in the eighteenth century by the Jesuit, Hundertpfund, and again in 1842 by Adalbert of Prussia, so little was known of the Xingu till quite recently that its southern affluents figured on many maps as tributaries of the Tapajoz. But the charts prepared from the surveys of Von den Steinen in 1884 and 1887 may be regarded as fairly accurate.

At its confluence the Xingu, already under the influence of the tides, expands into a vast lake like that of the Tapajoz. The strip of land separating it from the Amazons is divided by creeks into an archipelago of wooded islands, while a labyrinth of other channels is developed above the confluence along the right bank of the mainstream.

Throughout its course of about 2,000 miles between Tabatinga and Macapa, the Amazons maintains a somewhat uniform aspect, varying in breadth far less than the Rio Negro, and nearly everywhere narrow enough for at least a fringe of verdure to be visible on both banks from midstream. Below the Trombetas confluence it even contracts, at the Obidos narrows, to 5,000 or 6,000 feet, during the floods in June, with a mean depth of 250 feet, and a velocity of about 8,000 yards an hour. From these data it may be inferred that at this season the Amazons discharges at least 3,500,000 cubic feet per second, before receiving the contributions of the Tapajoz, Xingu, and some other affluents. During the great inundations the overflow south of Obidos runs into the Lago Grande de Villa Franca, a vast reservoir 34 miles long and from four to 10 miles wide. Many billions of cubic feet are thus withdrawn from the sea at this point. In the same place both Spix and Martius and Wallace have estimated the discharge in the dry season at not more than 530,000 cubic feet per second.

The annual rainfall of the whole basin cannot be calculated at less than 100 inches, which would supply a uniform discharge of at least 18,000,000 cubic feet. But large quantities are lost by evaporation in the vast reservoirs lining both banks of all the northern and southern affluents below the rapids.

THE AMAZONIAN MEDITERRANEAN.

Throughout the whole of the Amazonian basin, from the Andean foothills to the shores of the Atlantic, there everywhere occur tabular or horizontal terraces of sandstone and argillaceous rocks, ranging from 100 to about 1,000 feet in height. In the central part of the depression the northern and southern terraces recede to a distance of some 500 miles from each other; but at Obidos and Monte Alegre they approach much nearer to the fluvial banks. Between these two towns, Santarem on the left side stands at the extremity of a fragment of the same rocky formation, which extends to the shores and islands of the estuary, including most of the large island of Marajo and the sea-coast stretching south-eastwards in the direction of Piauhy and Ceara.

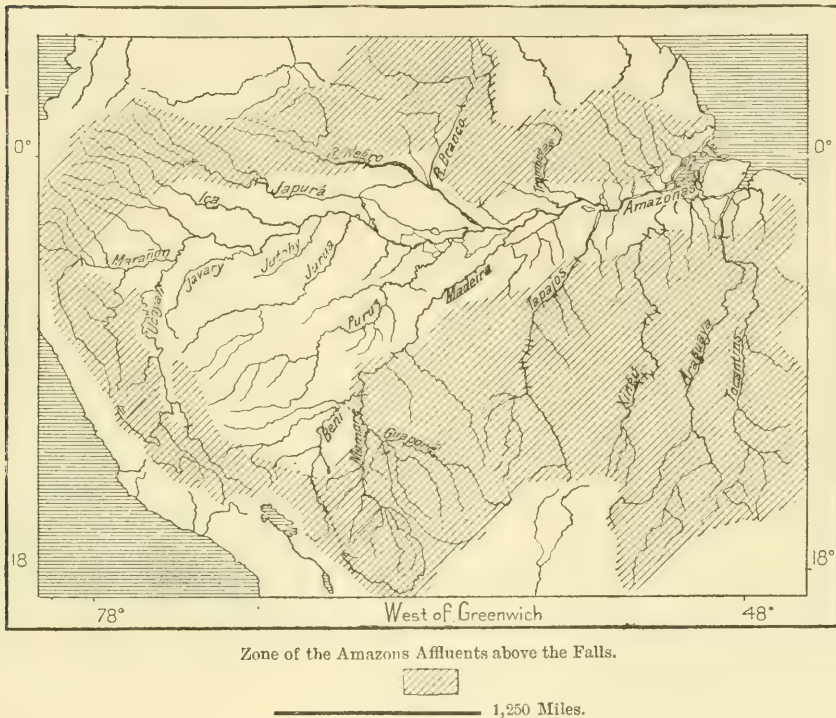
Whatever be the origin of this vast system of sedimentary strata, whether it is to be referred with Agassiz to glacial action, or with other geologists more probably to the paleozoic and especially the carboniferous ages, there can be little

doubt that at some remote period the whole region of plains and terraces formed the bed of a vast lake, or of several lakes constituting an American Mediterranean larger than the Canadian lake system, larger even than the Mediterranean of the Old World. In the Pebas cliffs on the Peruvian Marañon, Orton discovered, embedded in layers of many-coloured clays, a mass of marine shells comprising no less than 17 extinct species dating from the close of the Tertiary epoch.

At that time the Marañon, issuing from the Manseriche gorges, entered the inland sea through a delta, which, gradually advancing eastwards, at last filled the whole plain. Possibly the fluvial waters were then discharged north-eastwards in the direction of the Caribbean Sea through the depression at present traversed

Fig. 33.—AMAZONIAN DEPRESSION AND OUTER ZONE OF THE CATARACTS.

Scale 1 : 36,000,000.



by the Rio Negro, the Cassiquiare, and the Orinoco. At least the marine shells of the Upper Amazons resemble the types characteristic of the West Indian waters. In that case, the bluffs of Monte Alegre, the Santarem heights, and the other hills approaching the banks of the Amazons at the Obidos narrows, should be regarded as the remains of the ridge or dyke which formerly closed the basin of the inland sea and of the lakes ascending in terraces up the slopes of the Andes to Lake Titicaca.

THE AMAZONIAN FLOODS.

As regular in its periodical changes as the Nile itself, the Amazons rises and falls with the alternating seasons by a succession of "ebbs" and "flows" (*enchente* and *vasante*), in which the inhabitants recognise a sort of tidal move-

ment. On the Brazilian frontier it begins to swell in the month of February, and under the combined action of melting snows and torrential rains it gradually attains a level of 40, 50, or even 56 feet above low-water mark. But the flood waters, diversely influenced by the special inundations of the affluents on both sides, do not reach the lower Amazons till the month of April. In the lower reaches a sort of balance is struck between the waters coming from the north and from the south; the rise of the one corresponds with the fall of the other, so that the Amazons always exceeds the dead level that it would reach if regulated by the action of the Marañon alone.

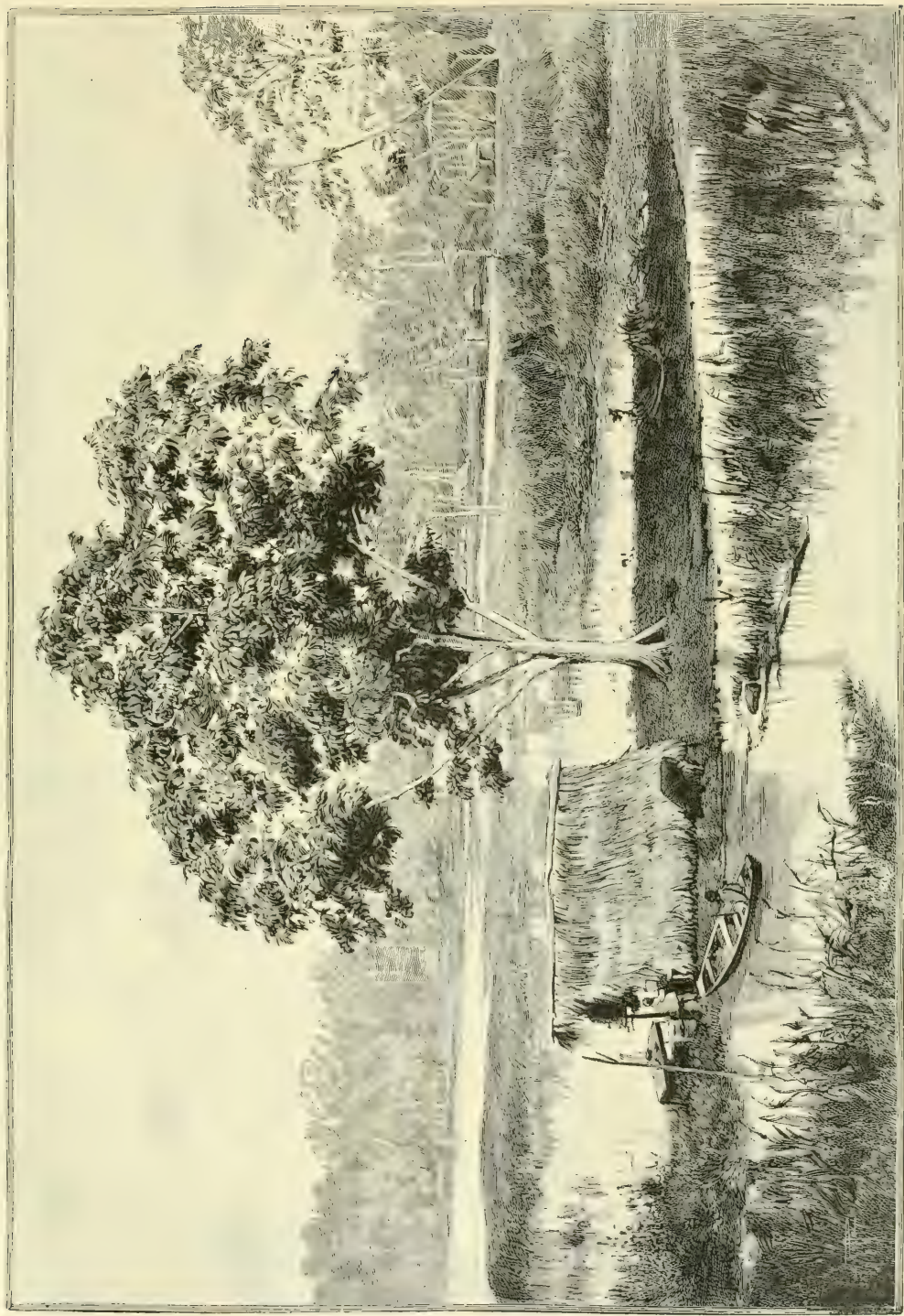
During the floods the low islands disappear, the banks are inundated, the scattered lagoons unite with the river and ramify in vast inland seas, driving the animals to take refuge in the forest trees, and the Indians to encamp on rafts moored to the shore. Then, as the stream begins to fall, the waters, returning to their bed, slowly erode the soddened banks by their underwash, and huge masses of earth suddenly give way carrying with them trees, snags, and animals. The islands themselves are often exposed to sudden destruction, and when the protecting barriers of drift-wood yield to the force of the current, a few hours suffice for the swirling waters to sweep them away. Then follow those long processions of tangled masses of earth, snags, branches, breaking asunder and again uniting, accumulating about the headlands, spreading along the margins, often transporting whole floras of herbaceous plants attached to the roots, whole faunas of birds perched on the boughs or of reptiles coiled round the stems.

THE AMAZONS ESTUARY.

The Atlantic tides ascend the Amazons as far as Santarem, over 600 miles from Cape do Norte, which is regarded as the terminal point of the estuary. But the salt water does not enter the river, and the only effect of the flow is to check the speed and raise the level of the fluvial current. Even round Mexiana Island in the middle of the gulf, the water is quite fresh and potable at all seasons.

The great clash between the fluvial and marine waters takes place in the broad part of the estuary where the Amazons, losing in depth, spreads over the lateral shoals and banks. Here the waves, impelled by the marine current and by the Atlantic swell in the direction from east to west, and especially from south-east to north-west, meet the fluvial waters on a rapidly-rising bed. Thus is produced the *pororoca*, that is, according to Barbosa Rodrigues, the *poroc poroc*, or "destroyer." This Amazonian bore exceeds in height all those developed in the Seine, Ganges, Yangtze, or elsewhere. Its terrible roar is heard at a distance of five or six miles, and the successive waves, the first of which is at times 10 feet high, form a complete barrier from shore to shore across the estuary. Their violence is felt especially about Cape do Norte towards the mouths of the Araguay and the Straits of Maraca Island.

The estuary, which is intersected by the equator, expands between Marajo Island and the Guiana coast to a broad marine inlet, forming that "fresh-water sea" which so astonished Pinzon and other navigators after him. West and

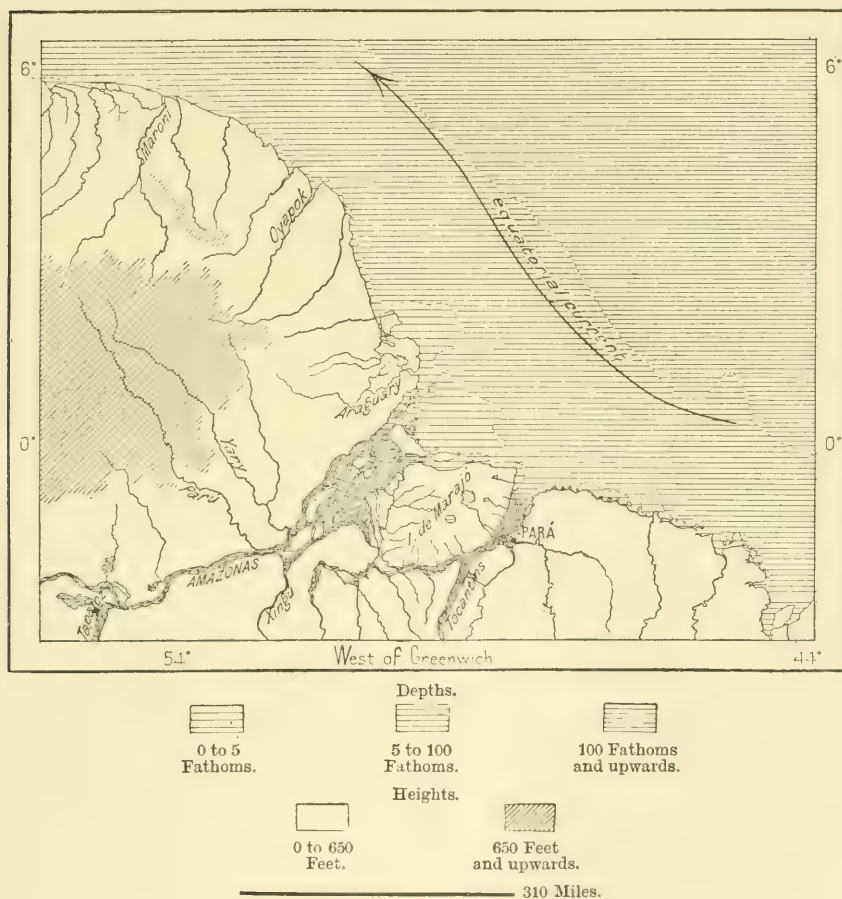


FLOODED BANKS OF THE AMAZONS.

south of Marajo Island the estuary ramifies into a labyrinth of creeks and channels, which merge in another estuary, that of the Rio Tocantins. At first sight all these fluvial waters might seem to belong to the Amazonian system. But the Amazons and Tocantins currents do not intermingle, or at least they do so to a scarcely appreciable extent. Nevertheless, the western creeks through which the Amazons communicates with the Rio Para are flooded by the waters of the great river. Thus a small portion of the larger current would appear to join that

Fig. 34.—AMAZONIAN GULF.

Scale 1 : 13,000,000.



of the Tocantins, and the Rio de Para might in a sense be taken for one of the mouths of the Amazons.

In the interior the sandstones of the Amazonian basin crumble away under the action of winds, rains, sun, and vegetation. But on the seaboard and in the islands of the estuary they are further exposed to the incessant attacks of the Atlantic waves. Both geology and contemporary history show that the sea is here steadily encroaching on the land, swallowing up islets, eating away the shores of islands and headlands. Thus the coast of Macapa on the north side of the estuary has considerably receded since the beginning of the century ;

Salinas Point, east of the Rio Para, and Santa Anna, east of Maranhão, have both lost ground, while Caviana in the archipelago crossed by the equator has been cut in two by a strait formed by the gradual expansion of two creeks on opposite sides of the island.

But what becomes of the prodigious quantities of sediment continually washed down by the Amazons, which, unlike the Mississippi and so many other great rivers, builds up no delta at its mouth? This sediment probably represents a cube 500 feet on all sides floated down every 24 hours. Such a mass spread over the estuary and surrounding waters would rapidly raise the marine bed but for the great equatorial current, by which it is caught up and distributed along the coast in the direction of the north-west. Some of the matter held in solution is thus deposited on the Guiana seaboard, while much more is dispersed over the West India waters, and especially along the shores of Georgia and both Carolinas. Here should probably be sought the true Amazonian delta; here would seem to be deposited the alluvial matter incessantly washed down from the equatorial Andes.

NAVIGATION OF THE AMAZONS.

Before the introduction of steam, sailing craft took five full months to ascend from Para to the "bar" of the Rio Negro, and five more to stem the current as far as the Peruvian frontier. At that time the circumnavigation of the globe even against unfavourable winds and currents took less time than the ascent of the Amazons with the trade winds setting steadily up stream. Steam, aided, since 1867, by the opening of the river to all flags, has effected a revolution in the Amazonian world, the consequences of which are making themselves felt more and more every year. The region of the Upper Amazons, formerly cut off from the great trading centres, has, so to say, been brought to the shores of the Atlantic, which is continued into the interior of the continent by the great river, presenting with its endless ramifications a prodigious system of navigable waters over 30,000 miles in extent. If the whole of Brazil be viewed as an island encircled by oceanic and fluvial waters, its periphery may be taken at about 14,000 miles, of which 3,500, or about one-fourth, belong to the Amazonian system.

Subjoined is a table of the mainstream with its more important Brazilian affluents:—

	Length in Eng. Miles.	Drainage area in sq. miles.	Mean discharge in cubic feet per second.	Navigable course.	
				Steamers.	Boats.
Marañon . . .	1,500	400,000	707,000	880	1,120
Northern Affluents {	Iça . . .	45,000	75,000	920	660
	Japura . .	118,000	177,000	970	920
	Rio Negro .	272,000	380,000	460	450
	Trombetas .	46,800	53,000	280	310
Southern Affluents {	Javery . .	34,500	50,000	500	560
	Jutahy . .	11,800	18,000	310	370
	Jurua . .	91,200	88,000	920	1,100
	Purus . .	147,000	141,000	1,120	1,550
	Madeira .	493,000	565,000	660	1,050
	Tapajoz .	164,000	183,000	200	860
	Xingu . .	150,000	141,000	75	630
Amazons from Peru to the Atlantic }	3,600	2,235,000	4,240,000	3,220	3,500

CLIMATE OF AMAZONIA.

The climate of this region is revealed by the action of the river itself, by the winds checking its current, the periodical oscillations of its discharge, the alternating rise and fall of its affluents. A "visible equator," as it has been called in reference to its course, parallel with the line intersecting its basin from the Andes to the Atlantic, the Amazons never leaves the zone in which the north-east and south-east trade winds contend for the supremacy. Usually these regular winds penetrate inland no farther than Manaus at the Rio Negro confluence, beyond which the aerial currents become less uniform, being deflected from their normal course by local influences, such as the Venezuelan llanos in the north, the Bolivian and Matto Grosso plains in the south.

The light breeze following the flow of the Amazons combines with the trades passing higher up to refresh the atmosphere, thus contributing to give the Amazonian lands a far greater relative salubrity than that of many other tropical regions. In April and the beginning of May the "general" winds, as the trades are called, prevail from Cape S. Roque to Maranhão, and are rapidly propagated along the seaboard, following in the wake of the sun on its course to the northern tropic. But on reaching the estuary they are arrested, or at least greatly retarded for a time, perhaps under the influence of the atmospheric current accompanying that of the river, and felt at a distance of 150 or 200 miles from the coast. Thus it happens that the south-east trades sometimes take quite two months to advance from Cape S. Roque to the Orinoco.

The prevalence of these winds coincides with the dry season from September to January, while the calms correspond with the rainy period from February to July and August. The mean rainfall for the whole basin probably exceeds 80 inches, the slight precipitation in the region of the savannas being compensated by the heavy downpours on the eastern slopes of the Andes. But great differences are observed between the climates of the lower and upper Amazonian districts. The latter, being less exposed to the fresh sea breezes, have a greater range of temperature; the Rio Negro is often swept by fierce gales and here fine and rainy weather follow without much regularity throughout the year. At Para, on the contrary, the seasons are much more sharply defined, despite the slight variations of temperature from month to month.*

AMAZONIAN FLORA.

The hot and moist Amazonian woodlands rival, and even surpass in their immensity the great forest zone of the Congo itself. The selva, that is, the thickly wooded region, occupies with little interruption a space estimated at about 2,000,000 square miles, or seventeen times that of the British Isles. Including the north-eastern tracts on the Guiana seaboard, it extends in a broad zone between the Amazons and the savannas, but is interrupted towards the

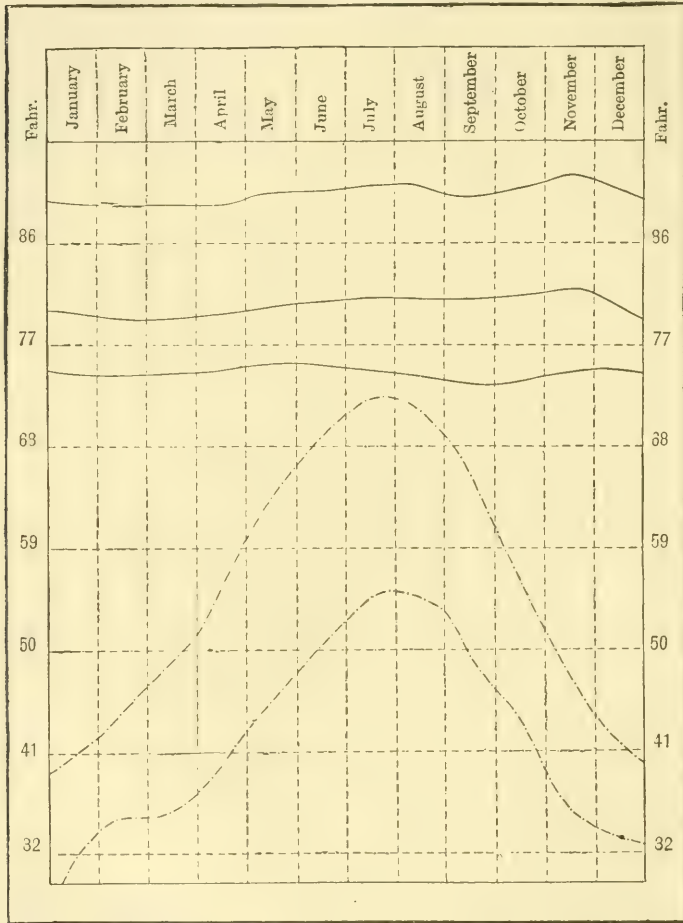
* Meteorological conditions of Para in Brazilian Amazonia :—

	Latitude.	Temperature.			Rainfall.
		Maximum.	Mean.	Minimum.	
Para . . .	1° 28' S.	95° Fahr.	82° Fahr.	72° Fahr.	120 inches.

Atlantic by extensive grassy spaces, such as the campo (plain) of Alemquer and parts of Marajo Island. Towards the west it broadens out over the Upper Orinoco basin, and also comprises the eastern slopes of South Colombia, of Ecuador, Peru, and Bolivia, as well as the low-lying plains traversed by all the southern Amazons affluents below, and even for some distance above, the rapids in the direction of the Brazilian plateaux.

Many parts of the selva have never been visited or traversed except by the

Fig. 35.—DIURNAL TEMPERATURES OF PARA AND LONDON.



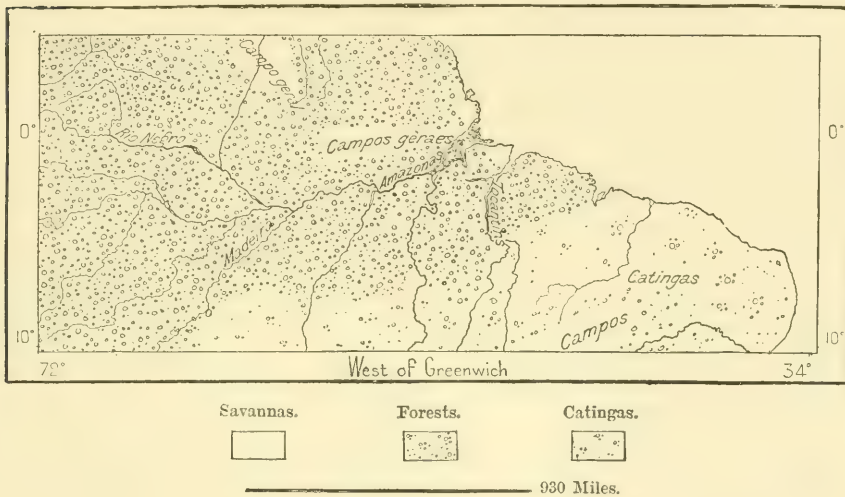
natural routes of its navigable streams, although its true character is not best seen from the banks of creeks or rivers. The traveller sailing up the Amazons sees little except a compact wall of forest trees interlaced with lianas, overtopped by a continuous mass of verdure, the stems rising on both banks like a line of palisades straight as reeds, enveloped in gloom at their base, expanding overhead to the light of the sun. From the boats in midstream no precise forms can be distinguished in this rampart of vegetation; to form some idea of the endless variety of trees and shrubs the observer must penetrate into some of these sinuous *igarapés*

which ramify amid the thousands of archipelagoes strewn over the Amazons. Here the plants overhanging the stream present an infinite variety of vegetable life, feathery or fan-shaped foliage, pendent clusters of bloom, gorgeous festoons of flowery creepers.

Viewed as a whole, the Amazonian flora is quite distinct from that of Brazil proper. Both doubtless possess many forms in common; but the contrasts are numerous, and the Para region resembles Cayenne in its flora and fauna far more closely than it does South Brazil. This remarkable fact seems to confirm the opinion of those geologists who hold that the Amazonian waters were formerly barred by a transverse ridge from access to the Atlantic through the present estuary. The species originating on the Guiana uplands might thus have been easily propagated southwards across Marajo and the other islands to South

Fig. 36.—AMAZONIAN SELVA.

Scale 1 : 40,000,000.



Amazonia. With these were intermingled some Andean forms descending from the upper to the lower reaches after the rupture of the transverse dyke.

An endless variety of local forms corresponds with the varying character of the soil, in one place alluvial or rocky, in another sandy or clayey, dry or marshy. The more recent riverside *igapos*, 14 or 15 feet above low-water mark, in many places occupying lacustrine depressions many hundred square miles in extent, are overgrown with tall grasses, willows, or trumpet-trees (*cecropias*). The zone of older *igapos* is recognised at a distance by other forms, including the rubber-tree (*siphonia elastica*). Higher up the belt of clays and alluvial tracts, flooded only during the inundations, are indicated by thickets of various palms and numerous other species. Then follows the firm ground, the old argillaceous bed of the inland seas, where flourish most of those large trees whose wood exceeds in beauty and hardness that of the finest European forms.

Although nowhere rivalling the Australian or Californian giants, some of the

trees attain a height of 180 or even 200 feet. Such are the moiratinga, probably a variety of the *mora excelsa* of Guiana; the samauma (*eriodendron samauma*), and the massaranduba, or "milk-tree," whose sap is taken with coffee, though large quantities appear to be dangerous. The widespreading branches of a gigantic ceaba, discovered by Wallis on the banks of the Rio Branco, covered a space of about six acres, where 25,000 persons might find standing room. The monguba, another species of bombax or silk-cotton tree, has the peculiarity of shedding all its leaves before sprouting again.

A strange and striking feature of Amazonian arborescence consists in the great development of the outer walls sustaining, but detached from, the stem, leaving an intervening space wide enough to afford refuge to several persons. Another characteristic of these woodlands are the countless species of parasitic growths, climbing the trunk to reach the light, or clinging to the branches, from which hang their long aerial roots, waving in the breeze, or interlacing with the ascending lianas.

Palms, of which there occur several hundred species, constitute a large proportion of the arborescent forms, even forming whole forests in certain sandy districts and on the margins of the savannas. In many places a single variety prevails—the graceful assaï (*euterpe oleracea*) round about Para; the paxiuba (*iriartea exhoryza*) in parts of the Japura and Iça valleys; the barrigoto (*iriartea ventricosa*) on the Upper Amazons; the piassaba in the Rio Negro basin; the tucum (*astrocaryum vulgare*) on the Purus and Jurua.

European travellers are surprised by the lack of bright flowers. Even orchids are rare, while edible fruits, abounding in some districts, are absent from others. The sandy river-banks with a sunny aspect yield the caju (*anacardium occidentale*), the fruit of which is much prized; the guajeru (*chrysobalanus icaco*) of the coastlands, the wild pineapple (*bromelia abacaxi*), the *inga lucida*, and the various passion-flowers, all contribute fruits or berries much valued by the natives.

Other products of the selva, cabinet-woods, rubber, various gums, resins, and camphorated substances, drugs, fibres, and dyewoods, exist in thousands and are daily being more and more utilised by human industry.

THE AMAZONIAN FAUNA.

The death-like stillness prevailing in many districts might lead the observer to suppose that animal life was poorly represented in these woodlands. But if individuals are few, the species present a great diversity. During his eleven years' exploration in Amazonia, Bates collected as many as 14,712 animal forms, of which 8,000 were completely new to science. Life teems even in apparently deserted parts of the selva; the gloom beneath the undergrowth may be forsaken, while the foliage bathed in light is alive with whole populations of insects, birds, and even mammals.

Most of the quadrupeds have so well adapted themselves to their environment that they advance easily from tree to tree. The land mammals are both few and nearly all of small size; even the tapir, largest of all, is smaller than the original

type. But on the other hand there are 38 members of the monkey family, all climbers and all with prehensile tails. The *cercoleptes*, a species of bear, is also of exclusively arboreal habits, and of the four kinds of ant-eaters (*myrmecophaga*) studied by Bates, three live in the trees, as do also the degenerate descendants of the colossal megatherium (sloth), besides various squirrels, snakes, and other reptiles.

Gulls and the frigate-bird ascend the Amazons to the Peruvian plains 2,500 miles from the sea, while the manatee and dolphins frequent all the large affluents as far as the first rapids. But the various species of cetaceans have acquired exclusively fluvial forms. The water boa (*eunectes murinus*), which sometimes attacks man, acquires enormous proportions in the Napo basin, where Osculati saw one which appeared to him some 50 or 60 feet long.

The Amazons waters are infested by the formidable *jacare uassu*, or great crocodile; but the turtle, which formerly swarmed in the main stream, has been nearly exterminated or driven up the affluents by the reckless destruction of its eggs. Both of these animals withdraw to the lakes and tributaries during the rainy season, returning in the dry period, or else burying themselves in the mud during the summer months. Saurians and fishes of identical species vary in colour according to the darker or lighter tints of the fluvial waters frequented by them.

All the running waters teem with fishes, and the 600 or 700 species estimated by Spix were raised by Agassiz to nearly 2,000 for the Amazons alone, that is, twice as many as in the Mediterranean, and more than in the whole Atlantic. The Hyanyary lagoon west of the Rio Negro confluence contains over 200, or more than all the rivers and lakes of Europe together. Some are extremely ferocious; the *piranhas* (*tetragonopterus*), despite their small size, attack man with great fury, and often snap off the lips of dogs and horses drinking in the streams infested by them.

Although poor in some bird forms, notably humming birds, Amazonia abounds in others, and Wallace alone collected over 500 different kinds. Aquatic beetles are rare, but on the other hand no less than 700 species of butterflies occur within a radius of four miles round Para. It was the extreme variety of the lepidoptera that enabled Bates to prosecute those comparative studies on transformation and mimicry that supplied so many arguments in support of Darwin's theory on the *Origin of Species*. Some of the winged pests, such as the nocturnal mosquito and the *pium* or day fly, render certain riverside districts in the Purus valley quite uninhabitable; the sauba ant also (*ecodoma cephalotes*), which lines its underground galleries with leaves, makes all tillage impossible in many places. Coffee plantations laid out at great cost have been utterly destroyed by its invading hosts. The galleries, which extend to a distance of 160 and even 200 feet, are the work of a delving population provided with a frontal eye like the fabulous cyclops or the modern miners with their Davy lamps. A denizen of these subterranean abodes is the amphibœna, "mother of the saubas," a harmless snake said by the natives to have two heads. Even more dreaded than the sauba is the *formiga do fogo*, or "fire-ant" (*myrmica rubra*), which has at times put whole communities to flight.

INHABITANTS OF AMAZONIA.

Amongst the few traces of the former inhabitants of Amazonia is a necropolis discovered near Manaus, evidently of great antiquity, containing hundreds of large mortuary jars of elegant design, but of unknown origin. To a more recent period would appear to belong the shell-mounds occurring near Para, in Marajo Island and in the Santarem district. The numerous fragments of human industry found in these mounds seem to have been deposited by the present riverine populations; some of the skulls differ in no respect from those of the Tapuyos. Like those of the Mississippi basin, some of the mounds affect the form of caymans or other huge animals, probably the totem of the tribe. Certain jade objects, "worth their weight in gold," are supposed by most observers to have come from the region of the Upper Rio Branco; one, representing a jaguar devouring a turtle, recalls the style of similar Muysca sculptures. Inscribed rocks have been discovered in many parts of the Rio Negro, Tapajoz, and Madeira valleys.

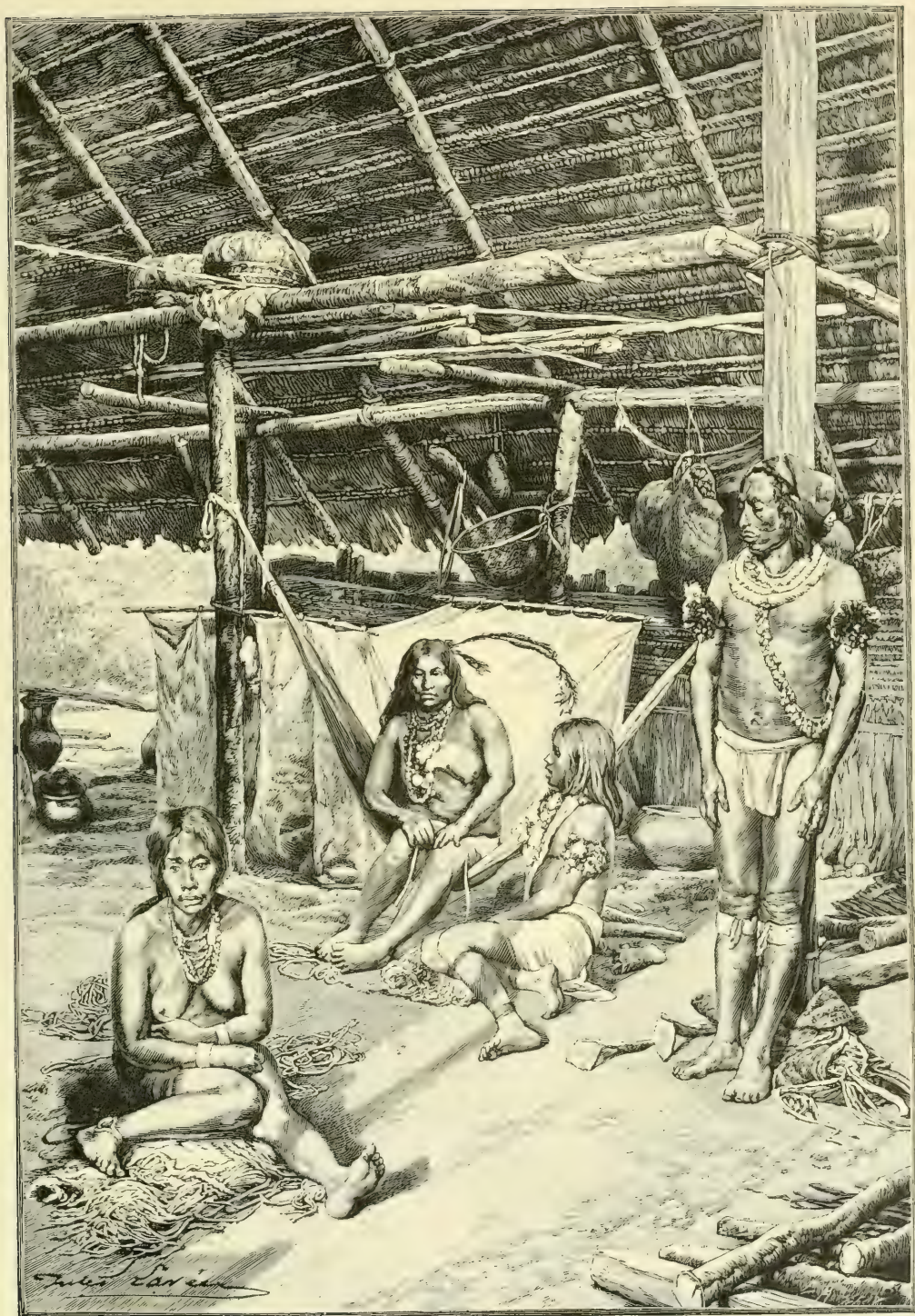
Of the 150 tribes recorded by Orellana on his memorable voyage down the Amazons all have disappeared, and such has been the destruction of human life that the white man would seem to have visited these regions only to create a solitude. Very few full-blood Indians now survive on the banks of the Amazons, and those formerly grouped in communities under the Jesuits are now merged in a homogeneous population speaking the *lingua geral* which had been taught them with the catechism, but which is itself now being gradually replaced by the Portuguese of the Brazilian traders.

THE TAPUYOS, ARAWAKS, AND CARIBS.

These Indians take the general name of Tapuyos, which appears to have formerly belonged to a Tupinamba tribe that migrated from East Brazil to Amazonia in the sixteenth century. They probably belong for the most part to the Tupi family, whose various dialects resembled that which the Jesuits reduced to written form and made the "general language" of Brazil. A purer form of this idiom appears to be the Guaraní of Paraguay, where is probably to be sought the origin of these Amazonian Tupis. Since the publication of the first Tupi grammar by Anchieta in 1595, this dialect has been sedulously cultivated, and now possesses quite a literature, in which the Brazilians themselves take a certain patriotic pride.

It is scarcely any longer possible to recognise the original elements amid the endless interminglings that have taken place between the red, white, and black races. The term *mameluco*, at first restricted to the children of white fathers and Indian mothers, is now commonly applied to all half-breeds. A very marked type is that of the *cafuzo*, the offspring of a black father and Indian mother, noted especially for his enormous head of bristly black hair, lank but not woolly. In general, the mixed Amazonian populations may be said to have gained in physical beauty and natural grace, as well as in intelligence.

Besides the Tapuyo half-castes, good boatmen, but indolent, and of little use



INTERIOR OF A TICUNA HUT.

on the plantations, all the affluents of the mainstream are still occupied by numerous full-blood aborigines, who have hitherto kept mainly aloof from the white and black intruders. Despite the studies of D'Orbigny, Martius, Crevaux, Coudreau, Ehrenreich, and other ethnologists, much doubt still prevails regarding the mutual affinities of these peoples, who, however, to judge from the analogy of their dialects, would appear to belong to a small number of original groups.

The *Arawaks* and the *Caribs* of Venezuela and Guiana are here also numerously represented; but the *Tupi* constitute the chief ethnical element throughout the southern section of the Amazonian basin. On the northern slope, and especially in the Iça and Japura valleys, the dominant people are the *Miranhas*, a general name applied by Ehrenreich to various scattered tribes living apart from each other. Another distinct group is that of the *Carayás* of the Xingu and Araguaya basins, who differ both in speech, physique, and usages from all the others. Of the entire Amazonian indigenous population, estimated at about 90,000, all these independent wild tribes number probably about one-half.

On the Upper Solimões the riverside populations are already very mixed, although still preserving their tribal organisation and traditions. Here are met a few Omaguas, recognised by their round, soft features, some Yahuas of haughty carriage, and the Ticunas, distinguished by their painted robes. The warlike *Miranhas* carry a rude spear of hard wood, and use a kind of drum hollowed from a single

block, which is heard "two leagues away," and with which they are said to communicate news from village to village, like some of the West African tribes. Like the old Quichuas, they ensnare the game by means of coarse nets suspended from tree to tree.

Near the *Miranhas* dwell some tribes of different stock, amongst others the *Carijonas* and the *Witotos*, or "enemies," whom Crevaux met on the Upper Japura, beyond the Brazilian frontier, and who are pure Caribs, while the *Passé* of the Lower Iça belong to the same stock as the *Arawaks*. These are distinguished by their fine physique, intelligence, gentle disposition, and skill, hence are much valued as domestic servants in Manaos. Like their Uainuma neighbours, they blackened a great part of the face with the juice of the *genipa*, whence the expression *Juri Pixuna*, "Blackmouths," often applied to them.

Fig. 37.—CAFUSA HALF-BREED.



RIO NEGRO AND TROMBETAS TRIBES.

On the Uaupes branch of the Rio Negro dwell the Uaupes, a group of 21 tribes speaking 15 different dialects, and according to Coudreau of diverse origin. Some, such as the dominant Tarianas, are undoubtedly Caribs, while the Macus, who roam the forests from the Andes to Manaos, would seem to be akin to the Witotos of the Upper Japura, though these also are stated to be true Caribs.

Most of the Uaupes differ in dress and usages as well as in speech, and their common religion appears to be the chief bond of union between them. Despite the zeal of the Catholic missionaries, they still preserve a national cult, in which are intermingled Pagan and Christian rites, the latter derived from the teachings of the Jesuits during the eighteenth century. Tupan, a great traveller, and author of the numerous drawings carved on the granite rocks about the cataracts, represents the God of the Christians. Jurupari, the native god, born of Virgin Mary, is an evil genius, who encourages drink, murder, and other vices amongst his people. In his honour are celebrated great feasts, dances, flagellations, and orgies; but he receives a secret worship, from which the women are jealously excluded. But all the Uaupes are disappearing, and in the Rio Negro basin civilised and savage together had been reduced to 8,000 in 1884.

On the other hand the Macusi, dominant on the southern slopes of the mountains drained by the Rio Branco, appear to have greatly increased since the eighteenth century, when they acquired the ascendancy over the Wapisianas. The Macusi, probably of Tupi stock, form two main groups, one in the east on the rivers Mahu and Takutu, the other in the west towards the Upper Uraricuera basin. Formerly much dreaded on account of their poisonous arrows, they have ceased to prepare the curare poison, and now use firearms. Their savannas being traversed by the natural highway between the Essequibo and the Amazons, they have recently taken to trade, and already begin to speak a little broken English.

Next to these the most powerful tribe are the Wayewé of the Upper Mapuerro, which flows to the Amazons under the name of Urubu. The Wayewé, that is, "Whites," are probably pure Caribs, men of splendid physique, noble features, fair complexion, and very industrious. The kindred Japii are "the finest Indians" met by Coudreau during his ten years' explorations in Guiana. This observer was surprised to find light hair and blue eyes amongst the Japii, while their northern neighbours, the Tucans, were distinguished by prominent cheekbones and oblique Mongol eyes.

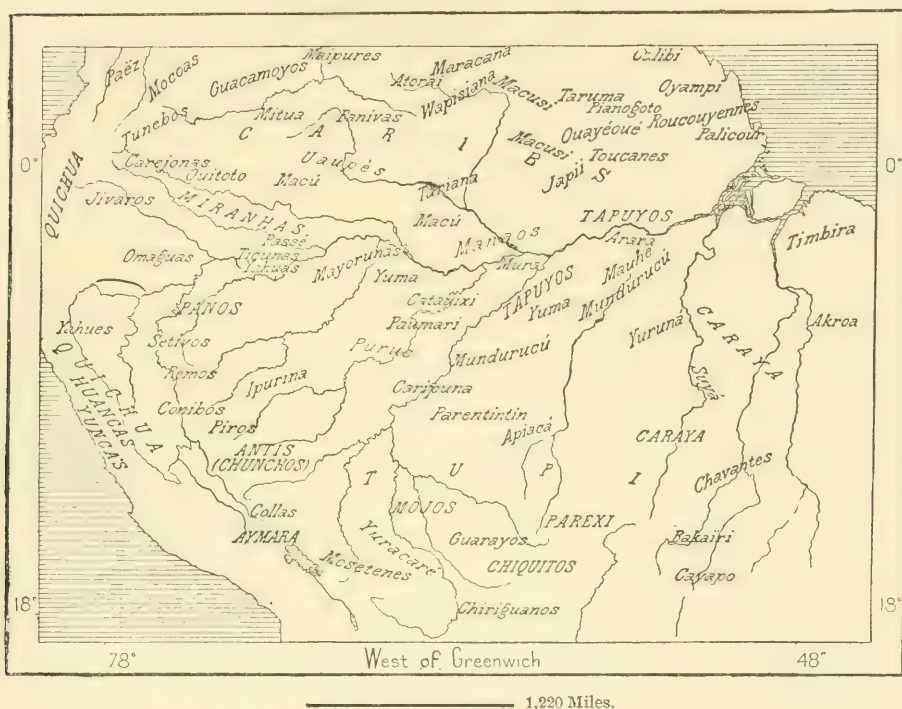
Except the Macusi, Wayewés, and Piangotos, all the independent tribes of the Rio Branco, Urubu, Yamunda, and Trombetas rivers appear to be decreasing. Several have even disappeared altogether, amongst others the Paravilhanas, "Bowmen," who were very powerful in the fifteenth century. Of the twenty-two groups recorded in 1787 only nine survive, and one of these, the Crichanas of the Rio Jauapery, at constant war with the whites, were threatened with extinction, when Barbosa Rodrigues succeeded in establishing peace between the

hostile elements. The Crichanas have the curious custom of burying their dead in the hollow trunks of trees killed by the close embrace of coiling lianas.

All the wild tribes being driven to the upper reaches above the rapids, the Tapuyos, Negroes, and Brazilians occupy the lower courses of the northern affluents, where some have formed little *mucambos*, or petty communal settlements, inhabited especially by runaway blacks, deserters, and freedmen. Through their influence Portuguese is gradually replacing the native dialects in this remote region where the *lingoa geral* had never penetrated. Here are still vainly sought the famous "Amazons" of the Icamiba nation, with whom the whites had to contend during their first voyage down the great river named from

Fig. 38.—INDIAN POPULATIONS OF AMAZONIA.

Scale 1 : 35,000,000.



them. According to Wallace, Orellana and his companions, seeing the young Indian warriors in the distance, with their long hair dressed in a top-knot, their necklaces and bracelets of berries, may have easily taken them for women ; hence the origin of the fabulous Amazons, suggested by classical reminiscences. Both Barbosa Rodrigues and Coudreau believe that the tribe of pretended female warriors is still represented by some of the Uaupes, whose chiefs possess "divine stones," quartz, jasper, or jade, through which they take years to drill holes, and which serve both as amulets and as badges of their authority. On the Upper Yamunda is seen a lake consecrated to "Mother Moon," into which the "Amazons" threw their *muirakitans*, sacred stones, representing animals, fishes, or other symbolic objects.

RIO JAVARY AND PURUS TRIBES.

Independent wild tribes are far more numerous on the southern slope of the Amazons valley, where they are reckoned by the hundred, all with their distinctive characters and special dialects, which, however, may be traced to one great linguistic family. Those of the Rio Javary, on the Peruvian frontier, are for the most part akin to the Panos, who appear to have reached a high state of culture before they were again reduced to barbarism and nearly exterminated by wars and epidemics. The various tribes of the Rio Jurua appear to be of Arawak stock, as are also the multitudinous little groups of the Purus valley. Amongst these the Ipurinas are noted for their physical beauty and dignified presence. They embellish themselves with black paintings on a scarlet ground, and also engage in fierce combats "for pleasure," so that most of them are covered with scars, of which they are very proud. A favourite game is to single out some tree as an enemy, and pierce it with arrows, uttering the sharp cry, "I-pu-ri-na, I-pu-ri-na!" whence their name. So many of their warriors perish in battle that the women greatly outnumber the men, and polygamy has become common.

Members of the Arawak family are also the Catauixi and the Paumari of the Lower Purus, although the latter bury their dead, like the Quichuas, in large earthen jars, which are deposited in mortuary cabins. The Paumari, that is, Pama-uri, "Berry-eaters," seem to be descended from the old Purus nation, who gave their name to the river. Between the Purus and Madeira confluences the right bank of the Amazons is roamed by a few survivors of the formerly powerful Mura nation, who were nearly exterminated by the Mandurucus towards the close of the eighteenth century. Although speaking a totally different language, Bates affiliates them to their Mundurucu enemies, who are of Tupi stock. They are so indolent that "lazy as a Mura sleeping on three strings" has become a proverbial expression, implying that they have not energy enough to net themselves proper hammocks.

RIO MADEIRA TRIBES—THE MUNDURUCUS.

About the cascades and rapids of the Madeira are encamped the Caripunas, or "Watermen," akin to other Caripunas of the Pano family, who occupy the Ucayali valley. East of them follow the Parentintius, whose territory stretches along the right bank of the Madeira, and thence through the forest eastwards in the direction of the Rio Tapajoz. These are full-blood Tupis, who appear to have migrated from the south, and who are at constant war with their eastern neighbours, the Mandurucus.

Very different from these warlike tribes are the harmless and indolent Parexi, Cabixi, Cachitini, and Vaimaré, all Arawak peoples inhabiting the campos or plateaux between the Guapore, Tapajoz, and Paraguay basins. These have come more in contact with the whites, who have taught them the use of firearms, as well as of iron implements for cultivating the soil. They are expert manufacturers of baskets, sieves, hammocks, and textiles, with which they procure European wares from the Brazilian traders. Thus they are becoming rapidly civilised, and many even get

baptized, though still preserving some of their old usages and religious practices. The dead are buried under the hammock of the nearest akin, and provided with food for the six days' journey which it takes to reach cloudland.

Along the middle course of the Tapajoz dwell several Tupi tribes, such as the Apiacas (Abiabas, or "Men"), the Mundurucus and the Mauhés. Although usually of peaceful habits the Apiacas still occasionally indulge in their old cannibal practices. Those tattooed with three horizontal bars on the cheek are privileged to eat their prisoners of war, the children captured on their predatory expeditions being spared till their twelfth year, when they are served up at their sacred feasts. Rumour speaks of a mysterious people in their district, the Jacaréuaras, a race of albinos said to travel only at night, hence usually called *Morcegos*, or "Bats."

Of all the Brazilian aborigines the most powerful are the Mundurucus, said by Bates to number 20,000, and regarded by Couto de Magalhães as typical children of nature. Their settlements follow along the banks of the Tapajoz and in the forest glades, and from them the whole country takes the name of Munducuriana. Tall, stout, muscular, and of somewhat clear complexion, the various tribes and classes are distinguished by their respective tattoo marks, which, although falling into disuse, are still held in great respect. So elaborate were the designs that it sometimes took ten years to complete the picture.

Loyalty to their pledged word, a proud and noble bearing are characteristics of the Mundurucus, who are also skilled husbandmen and expert at featherwork and various other arts. Formerly very warlike, they have developed a thorough military organisation, preparing in peace for war, so that at the first sound of the drum all fly to arms and muster in vast barracks, from which the women are excluded. They always attack at dawn, their manœuvres being directed by the varied beat of the drum. In the fight no quarter is given, but after the victory every care is taken of the women and children, the latter being adopted to repair the losses sustained in battle.

RIO TAPAJOZ AND XINGU TRIBES.

The Mauhés of the Lower Tapajoz, who have given their name to an extensive system of creeks and channels on the south side of the Amazons, appear to belong to the same group as the Mundurucus, although long separated from them, and speaking a totally different language. East and west of them are the fierce Arara (Yuma) Caribs, who attack always by night, and who are regarded by the surrounding populations rather as demons than men. Till lately the Mauhés were the only natives who prepared the guarana, a decoction obtained from the beans of a species of liana (*paullinia sorbilis*), which is used throughout Brazil and even in Bolivia against dysentery and ague. In local business transactions the paullinia beans serve as currency.

East of the Tapajoz the Xingu basin appears from Karl von den Steinen's researches (1884—87), to have been the point of dispersion for the various Carib tribes, which under so many names have spread in successive waves of migration north-west to the foot of the Andes, northwards to Guiana, Venezuela, and the

Antilles, and whose origin had hitherto been sought in the West Indies, or even in the North American continent. The Bakairi and their northern neighbours, the Nahuquas, are the purest members of the Carib family, judging at least from their speech, which has been least modified by foreign elements.* Although surrounded by Tupi and other races, they keep so aloof that till quite recently they still belonged to the stone age, with no knowledge of the metals, of the dog, of the banana and many other edible fruits well known to their neighbours. They smoke no tobacco and prepare no fermented drinks, while their earthenware is greatly inferior to that of the kindred Roucouyennes of French Guiana.

From all this Von den Steinen concludes that of all the Caribs, the Bakairi stand nearest to the primitive stock and to the cradle of the race. The national legends speak of migratory movements in the direction from south to north, and such movements have taken place even in the contemporary period. The Araras scattered along the south side of the Amazons have the same tattoo markings as the Bakairi, a blue line crossing the cheek from the corner of the mouth to the outer angle of the eyelid.

Some of these primitive Caribs, converted to Christianity about the year 1820, have at least adopted a show of culture, and their chief, dressed in an official costume, has become a Brazilian captain. But there still remain some groups of independent Bakairi, of peaceful habits, fond of music, and building straw huts with a narrow entrance, like large bee-hives. Having little knowledge of the industries, they procure various manufactured objects from their Suyá neighbours, who live farther down on the right bank of the Xingu. These Suyas are distinguished by their tall stature, physical strength, energy, and skill in making pottery and wicker ware.

On the Lower Xingu the chief people are the Yurunas of Tupi stock, formerly cannibals, but now noted for their gentle disposition and hospitality. Nevertheless, they still avoid contact with the whites, and continue to deck themselves with glass bead necklaces, girdles, and pendants, and wear the hair plaited in a single long pigtail. They are unsurpassed in taming animals, and every village is a menagerie of tapirs, monkeys, agoutis, toucans, parroquets, and other pets. The Yurunas would be the happiest of mortals but for the raids of the fierce Carayas, who infest the right bank of the Xingu, and who are akin to others of the same name in the Araguay and Tocantins basins.

TOPOGRAPHY OF AMAZONIA.

The impression produced on a traveller steaming up the Amazons is that of a boundless solitude. Towns properly so called are extremely rare, and many stations whose names are of frequent occurrence in books of travel are mere clusters of cabins. Such is *Tabatinga*, the frontier post towards Peru, which consists of two or three little dwellings and a half-ruined fort on the left bank of the Amazons, here 1,600 yards wide. A somewhat large place is *S. Paulo de Olivença* on the

* Karl von den Steinen, *Durch central Brasilien*; Paul Ehrenreich, *Petermann's Mittheilungen*, 1891, Heft IV

south side, which stands on a bluff rising 215 feet above low-water level. *Tunantins*, on the left bank between the loops of the Iça and Jutahy affluents, stands on the site of the old mission of Tunati.

Being easily navigable to the foot of the Andes by craft drawing six or seven feet, the Iça is much visited by rubber and sarsaparilla seekers. Its upper course is occupied by the Macaguajes, the middle by the Orejones, and the lower by the Ticunas. The Orejones slit lips, ears, and nostrils for the insertion of ornaments, wear a willow band as the national costume, still wield the stone axe, and make some fine pottery.

From Tunantins to the port of *Fonte Boa* ("Good Well") follow a series of islands formerly frequented by millions of turtles, which yielded vast quantities of oil to the Portuguese traders. But being recklessly hunted down, they have now forsaken these breeding-grounds.

TEFFE—STATIONS ON THE PURUS AND MADEIRA.

Teffe, formerly *Ega*, owes its present name to the river on which it stands. Although containing less than 1,000 inhabitants, it ranks as a great city in the Solimões basin. Its foundations were laid in 1668 by the missionary Samuel Fritz as a station for Indians who have since lost their tribal name and become merged with the other half-caste Tapuyo populations. In 1781 the Hispano-Portuguese Boundary Commission established its headquarters at Ega, and the naturalist Bates made choice of the same place as the centre of his excursions in Upper Amazonia during the years 1850-59.

Teffe enjoys great natural advantages in its healthy climate, its almost complete immunity from mosquitoes, its rich soil and vegetation, its excellent commercial position in the centre of a network of navigable waters, and lastly its spacious harbour formed by the deep lake fed by the Rio Teffe by a lateral channel on its right bank. It is also a pleasant place of residence, every house having its orange and banana grove and its turtle pond.

On the west side of the lake stands the village of *Nogueira*, famous throughout Amazonia for its earthenware decorated with geometrical designs. Farther down follow the settlements of *Coary* (*Avellos*) on the right bank, at the mouth of the Rio Coary, and *Codajaz* on one of the creeks, through which the Lower Japura communicates with the Solimões.

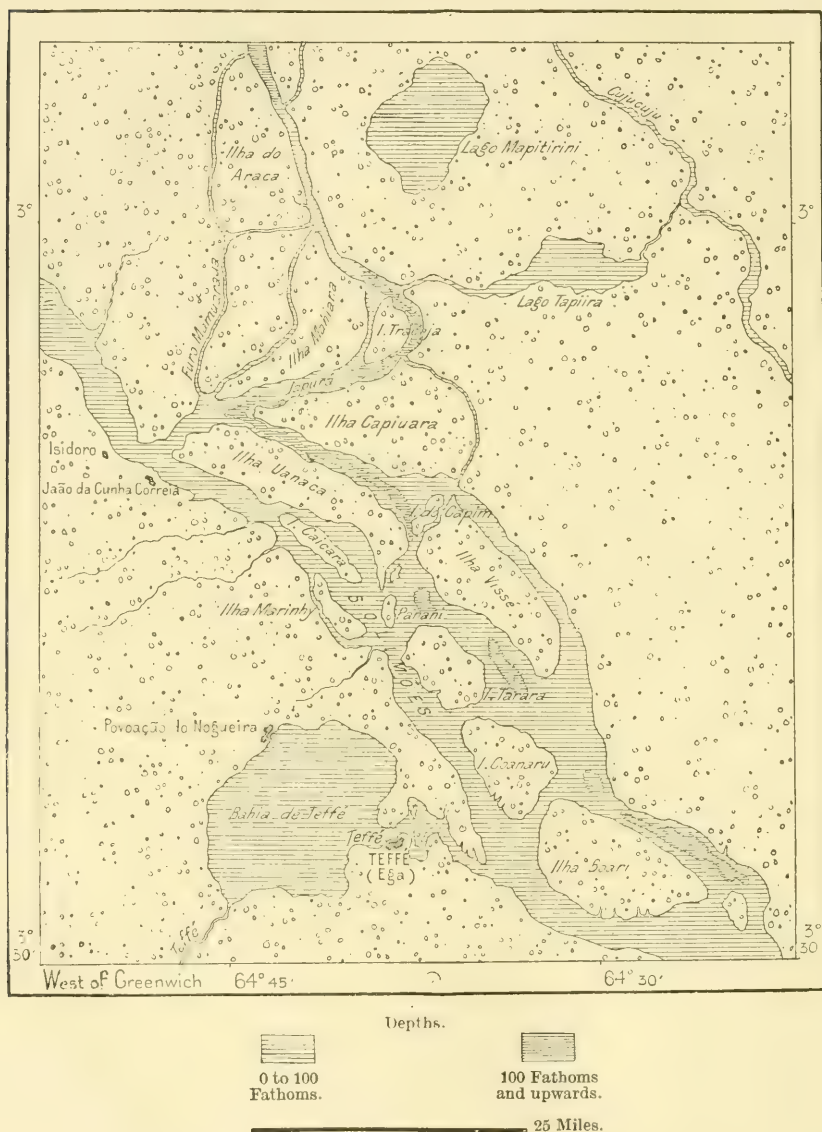
Till recently the great River Purus, longer than the Danube, had not a single white habitation on its banks. But despite its insalubrity, the crowds of mosquitoes, and other drawbacks, the extreme richness of its forests in rubber and other valuable products has somewhat suddenly begun to attract settlers. The first steamer, which made its appearance in 1862, was followed in 1869 by a flotilla of 15 boats, by which a regular service was established from the Amazons to the first camping grounds of the *seringueiros*. These rubber-hunters increased from 2,000 in 1871 to no less than 50,000 in 1890, nearly all nomads, besides the local tribes.

In 1871 Labre, one of the most active explorers of the Upper Purus basin,

founded the station of *Labrea*, which perpetuates his name, and which has become the capital of the district. It stands at the converging point of the routes followed by the seekers of rubber not only in the Upper Purus and Aquiry basins, but also in the remote regions watered by the Beni and the Madeira. At present steam

Fig. 39.—TEFFE AND JAPURA CONFLUENCE.

Scale 1 : 1,000,000.



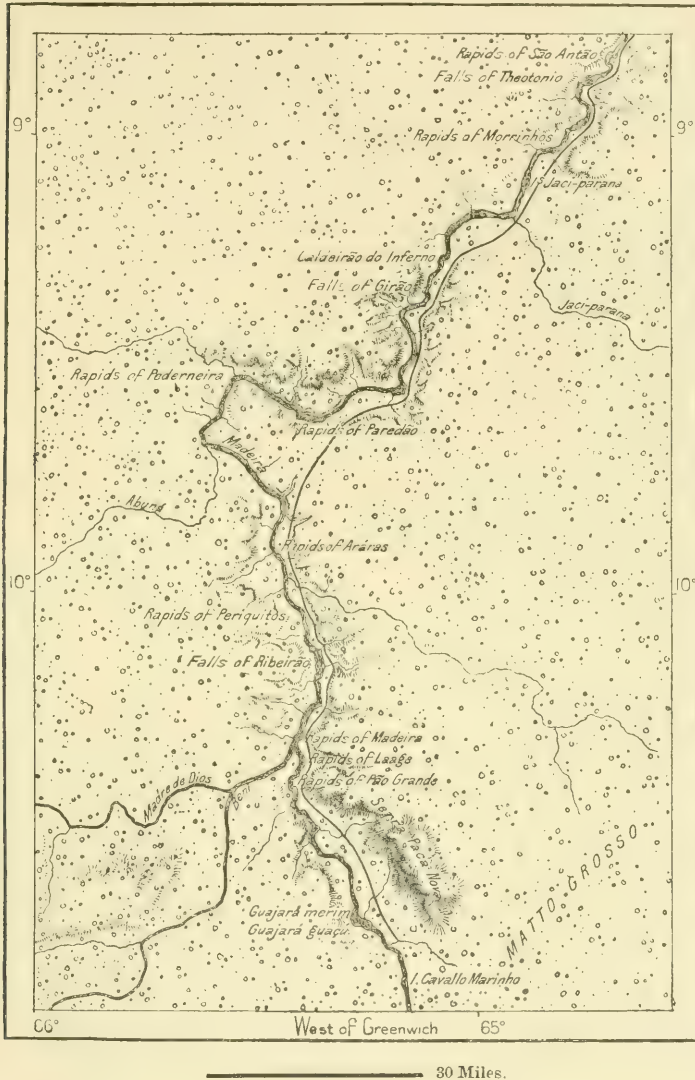
navigation on the Purus stops at the little port of *Hyutanaham*, some hundred miles below *Labrea*.

From the economic standpoint the Madeira may be regarded as forming part of the same domain as the Purus, but only below the cataracts. Higher up, the Guapore region, formerly an independent lacustrine basin, belongs to the Matto

Grosso world, with different natural conditions and centres of attraction. But the Lower Madeira traverses regions analogous to those of the Purus. It has even been proposed to connect both valleys by a road, if not by a railway, to run from

Fig. 40.—MADEIRA FALLS AND PROJECTED RAILWAY.

Scale 1 : 1,700,000.



the Madeira above the falls to the Beni, and thence to the Aquiry at the head of the boat navigation of the Purus.

But the works already begun aimed also at turning the Madeira rapids by a lateral railway; speculators had been occupied with this project since 1867, and according to the plans of the engineer, Keller, the line, about 180 miles long, might be built for about £600,000. But although the works have had to be abandoned through diplomatic and other complications, a certain traffic is still kept

up between the two navigable sections of the Madeira despite the labour and expense involved in loading and unloading at the different portages.

Santo Antonio on the right bank guards the lower approaches to the cataracts. Lower down all the way to the Amazons, a distance of 660 miles, the only settlements are a few little hamlets, such as *Crato*, *Humaita*, and *Borba*. *Crato* has succeeded another *Crato* which served as a place of exile for political offenders under the Portuguese rule.

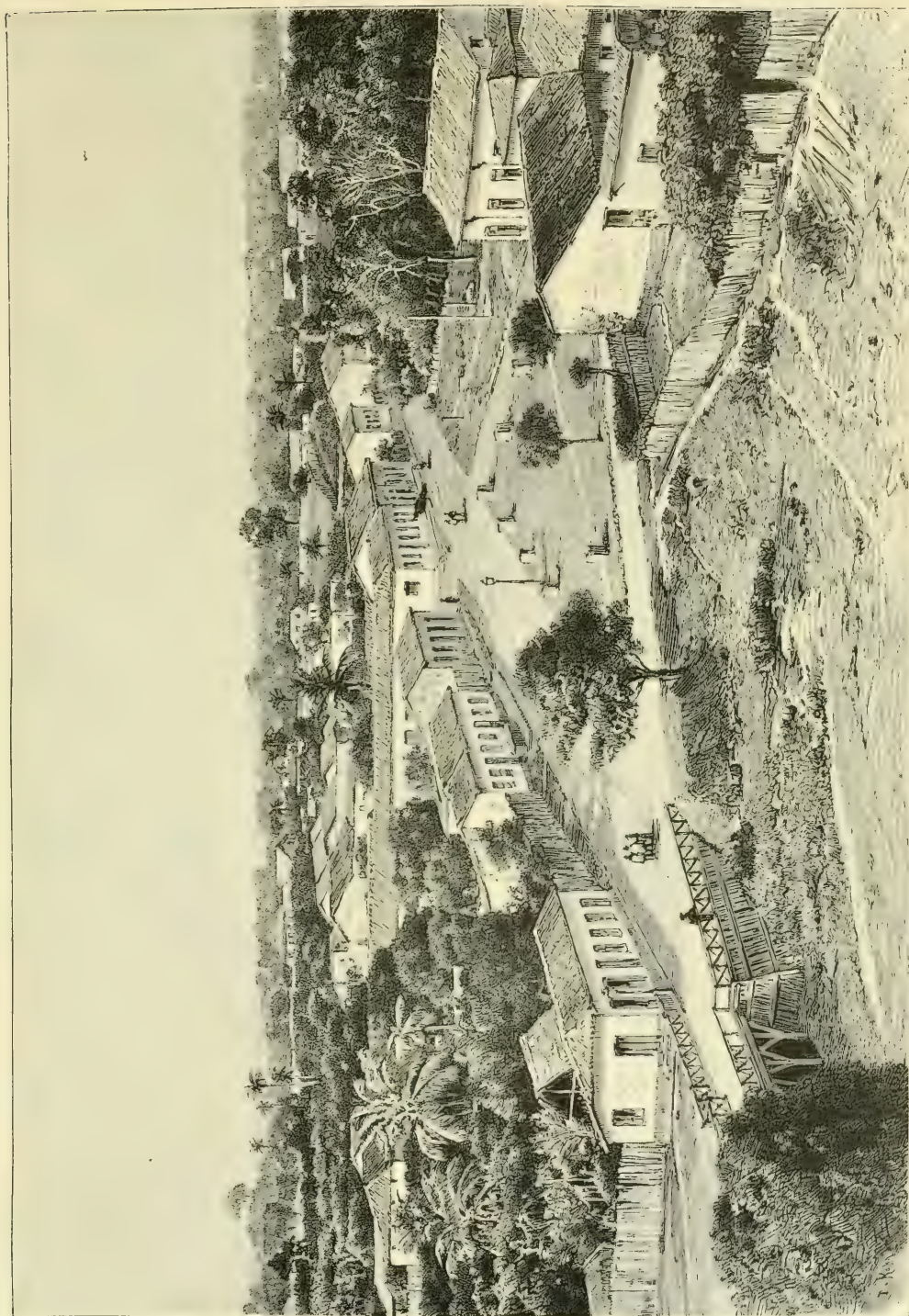
STATIONS IN THE RIO NEGRO BASIN—MANAOS.

The Rio Negro, interrupted, like the Madeira, by rapids, has scarcely more inhabitants along its lower course above Manaos. Towards the close of the eighteenth century the riverside stations of *Thomaz*, *Moreira*, *Barcellos*, and *Ayrão* had acquired some importance, thanks to the enforced labour of the natives on the cotton, rice, indigo, coffee, cacao, and tobacco plantations, and in the cotton spinning and weaving factories. But this industry, which supplied cotton stuffs for the whole of the Rio Negro basin and even for the province of Para, rested on the unstable foundation of a system of practical slavery, and was ruined by a change in the local administration. The Indians took refuge in the forests, and the settlements were soon reduced to a few groups of wretched hovels.

On the banks of the Uaupes are situated some groups of population, such as *Juaurité*, *Panoré*, and *Taraqua*, which, having about 300 inhabitants each, seem like veritable cities amid the surrounding wilderness. Of the so-called "towns" on the Rio Negro below the Uaupes *Barcellos* is the largest, yet at the time of Coudreau's visit in 1884 it comprised only 30 houses. But in the last century, when it was the capital of a "captainry," it had as many as 4,000 inhabitants. Most of these emigrated in 1809, when *Barcellos* was replaced by Manaos as the centre of the administration.

At that time the Rio Branco also contained a few large villages, such as *Santa Maria*, *Carmo*, and *Pesqueira Real*, the very sites of which can no longer be identified. They are chiefly replaced by the pleasant little town of *Bõa Vista* on the left bank below the fort of *S. Joaquim*.

Manaos, formerly *Barra*, or *Fortaleza da Barra do Rio Negro*, takes its present name from a powerful Tupi tribe, who offered a stout resistance to the Portuguese invaders. It occupies a considerable space on the left bank of the Amazons above the level of the highest floods and about 10 miles above the Rio Negro confluence. Since 1850, when it became the capital of Amazonia, it has gradually attracted to itself nearly all the trade of the great river and its innumerable affluents. Its advantageous position at the converging point of the great navigable highways of the Solimões, Amazons, Rio Negro, and Madeira makes Manaos the natural emporium for the produce of half Brazil. Being also accessible to deep-sea vessels, it has developed a direct foreign trade since 1876; hence in recent years the population has greatly increased, especially by immigration from Ceara, and according to Barbosa Rodrigues, here are already concentrated half the inhabitants of the vast province of Amazonia. Here also reside most of the foreign



MANAOS—VIEW TAKEN FROM THE SUBURBS.

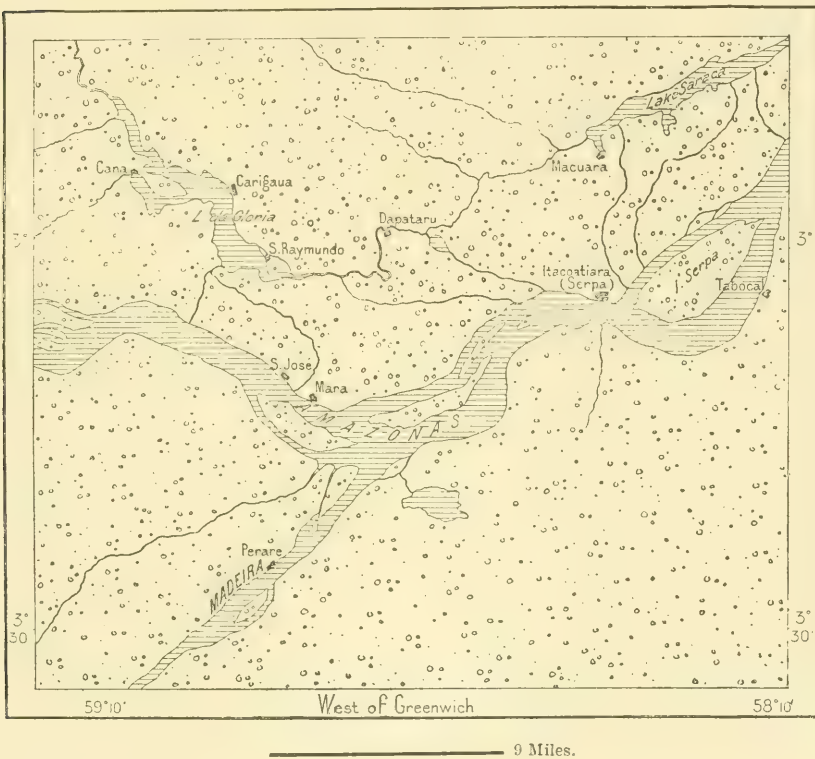
merchants, especially the English, who have nearly monopolised the trade of the Purus basin, and the French, Jews and Christians, who are chiefly interested in the rubber industry of the Rio Jurua.

STATIONS ON THE LOWER AMAZONS.

Itacoatiara, formerly *Serpa*, crowns a high bluff on the north side of the Amazons a little below the Madeira confluence. Lower down on the south side is seen the old station of *Villa Bella* (*Villa Nova da Rainha* or *da Imperatriz*, according to the political changes), now *Parintins*, where begin the cacao planta-

Fig. 41.—ITACOATIARA AND MADEIRA CONFLUENCE.

Scale 1 : 500,000.



tions which form the chief wealth of the country. These are continued along the banks intermingled with other profitable cultures, such as tobacco, roucou, guarana, bananas, and maize. On the opposite side stands the town of *Faro*, near the point where Orellana met his pretended "Amazons."

Obidos, the ancient *Pauxis*, occupies a somewhat important strategical position on the left bank of the Amazons at the narrowest part of its course through Amazonia. But its importance is more apparent than real, and the country has benefited less from the garrison of the neighbouring fort than from the *mocambistas* (deserters) who have taken refuge in the Trombetas valley. Here they have laid out some coffee, cacao, and maize plantations, and have become almost

assimilated to the aborigines by alliances with the Piangoto Indians, through whose kinsmen beyond the mountains they have opened commercial relations with the Dutch of Surinam.

Alemquer, on a lateral creek of the Amazons east of Obidos, is increasing in wealth and population, especially by developing the natural resources of the vast savannas of the Campo Grande, which stretch away to the frontiers of Guiana.

Fig. 42.—OBIDOS.

Scale 1 : 380,000.



Although sheep and goats have not yet been acclimatised, horned cattle and pigs multiply rapidly on these magnificent grazing grounds.

SANTAREM.—PARA.

Between Manaos and Para the chief place is *Santarem*, at the mouth of the Tapajoz, which was founded in 1758, but at first made little progress despite the advantages offered by its navigable waters. The port is accessible to vessels of the heaviest tonnage by taking advantage of the tides and the trade winds, which prevail almost uninterruptedly for six months in the year. From the Atlantic to Santarem the river and its estuary are disposed nearly in a straight line, so that sailing vessels are able to ascend by running before the wind on a single tack.

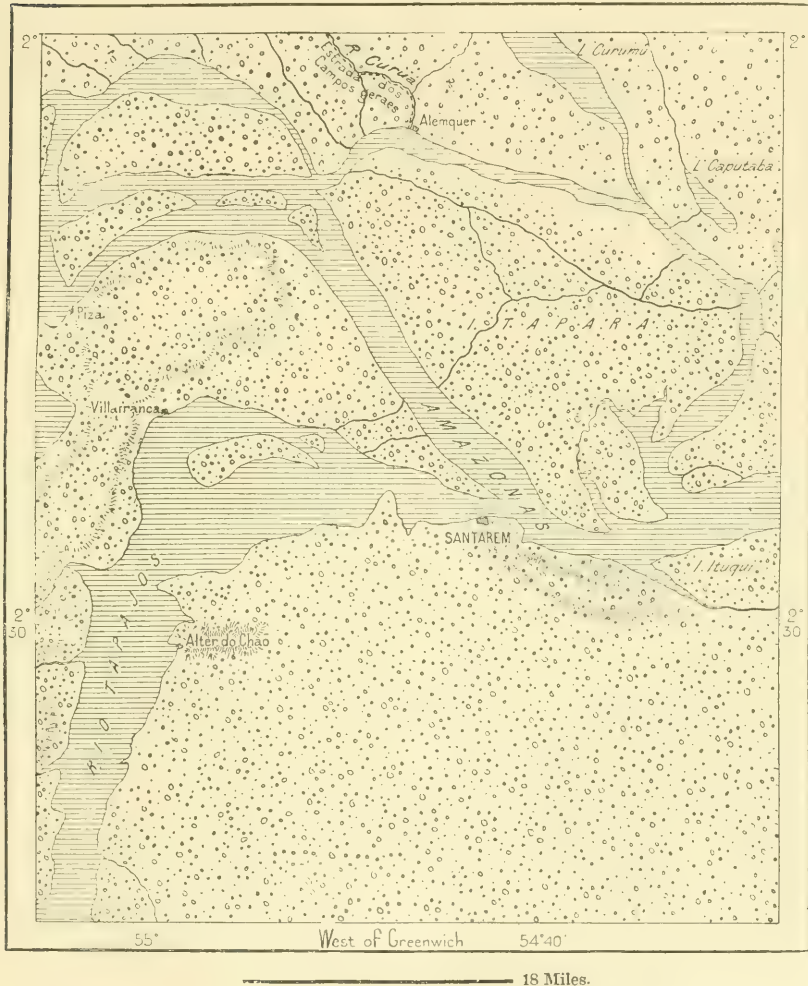
Steam navigation has further increased the commercial advantages of Santarem ; but on the Tapajoz all river craft are still arrested by the cataracts above

Itaituba, 275 miles from the confluence. Hence, the resources of the backwoods, which yield vanilla, copahu, rubber, and other valuable products, have been little developed. But the magnificent tonka (*tonga*), identical with the *sarrapia* (*dipteryx odorata*) of the Orinoco basin, grows in abundance in the Santarem district itself, and from it is obtained a costly aromatic essence.

On the west side of the neighbouring lagoon formed by the Tapajoz at the

Fig. 43.—ALEMQUER—SANTAREM.

Scale 1 : 800,000.



confluence stands the little town of *Villairanca*. In the vicinity of this place the Brazilian Government possesses a vast cacao plantation inherited from the Jesuits. Higher up, on the same side of the river, some Americans from the banks of the Mississippi founded an agricultural settlement after the War of Secession; at present the station is largely inhabited by Brazilians.

The south side of the Amazons below Santarem is the most thickly-settled region in the whole basin. Here houses and plantations follow uninterruptedly for

30 miles at the foot and on the scarp of a sandstone plateau which skirts the river at a distance of five or six miles inland. This is the so-called *montanha* ("mountain"), although it rises scarcely more than from 430 to 500 feet above the stream. Numerous *taperas* and *taperinhas* ("ruins" and "little ruins"), as well as the remains of causeways, show that even in pre-Columbian times the region was densely peopled.

Farther on, but on the north side, stands the pleasant little town of *Monte Alegre* ("Merrymount"), which fully deserves its name. Unlike all other Amazonian settlements, it stands, not on a riverside cliff or bluff, but on a real hill overgrown with cacti, and from its terraced slopes an extensive prospect is commanded of the long meanderings of the great river, the fringing lagoons and their network of creeks and backwaters, all separated by the serpentine belt of woodlands and savannas.

Lower down follow *Almeirim* at the mouth of the Paru, peopled by Aracaju Indians; *Porto de Moz*, commanding the labyrinthine waters about the Xingu confluence, and visited by the steamers which ascend to *Sousel* below the last Xingu falls; *Gurupa*, in the north-east on another network of navigable creeks, for a time occupied by the Dutch. After their departure, Gurupa, which takes its name from an extinct Tupi tribe, was made the port of entry and custom-house for the whole of the Amazons basin.

Macapa, founded by the Portuguese in 1744 on the north side of the estuary just two miles north of the equator, was originally intended to be the bulwark of Amazonia. The passage is even still guarded by a strong citadel, which, however, is useless for the defence of such a broad estuary, and Macapa, owing to the dangerous approaches, has never developed into a trading place. *Mazagão*, some 40 miles inland, takes its name from the Moroccan city of Mazagan, the present el-Brija, which was held by the Portuguese for two centuries and a-half till the year 1770.

On Marajo Island the chief places are *Breves*, on the deep southern channel of the Amazons; *Chaves* on the north side, and *Saure*, near the old settlement of *Johannes*, from which the island takes its alternative name of Joannes.

Para, whose full official name is *Santa Maria de Nazareth de Belem do Grão Para*, from a much-frequented place of pilgrimage, stands on a slightly elevated beach east of the great estuary or gulf of Para, called also gulf of the Tocantins. This part of the broad sheet of water, known as the Guajaru channel, ramifies into the interior of the city, where it is joined by the little river Capim, while other creeks radiate in all directions. Occupying a level space unbroken by any hills or rising grounds, Para presents towards the estuary nothing but a long frontage of somewhat commonplace structures. But despite its general unpicturesque aspect, there is no lack of pleasant quarters in the interior, where the houses, with their ornamental balconies and façades of encaustic tiles, are shaded by large, wide-spreading trees. Some of the avenues are lined with ceibas, some with palms, and others with the bread-fruit tree, while the suburbs are interspersed with orange groves gradually merging in the spontaneous vegetation of the



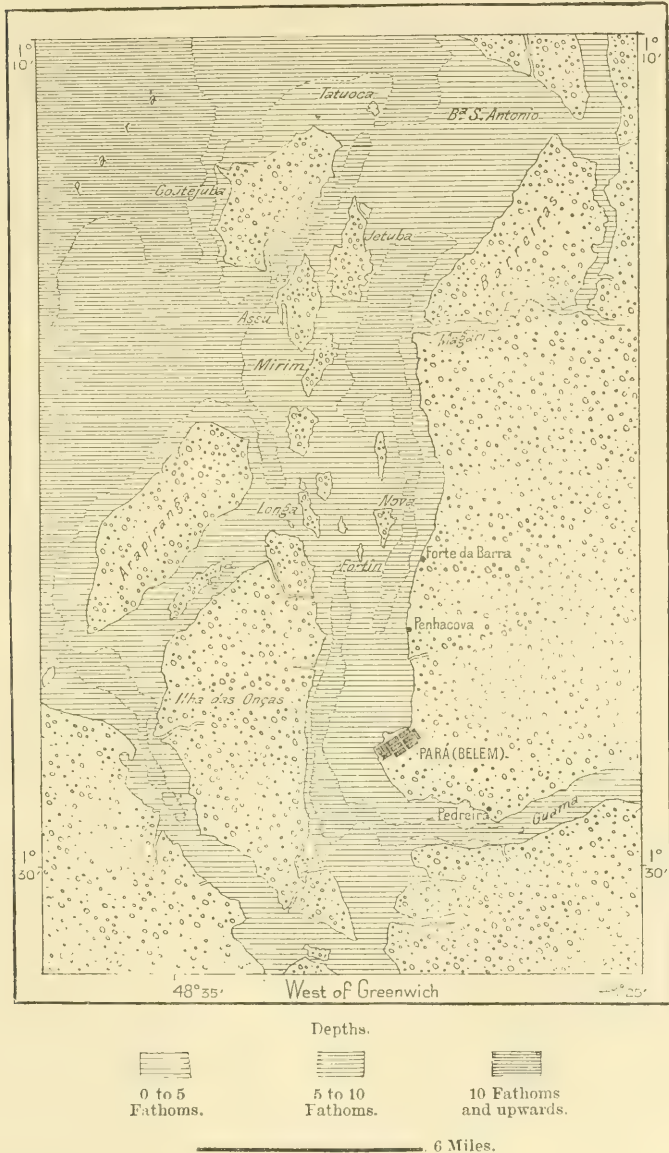
PARA—VIEW TAKEN FROM THE RIVER.

surrounding woodlands. But a more businesslike air prevails in the commercial quarters, for Para has become a great trading place, being surpassed in this respect only by the capital and three other Brazilian cities.

Founded in 1615, Para grew slowly till the separation of Brazil from the

Fig. 44.—PARA AND ITS ROADSTEAD.

Scale 1 : 350,000.



mother-country. Then as the imperial capital it continued to be a hotbed of social and political disturbance, and was nearly ruined by the so-called *Cabanagem*, a social war involving many conflicting elements, which broke out in 1835, and left the city reduced from a population of 24,500 in 1819, to 15,000 in 1848. In

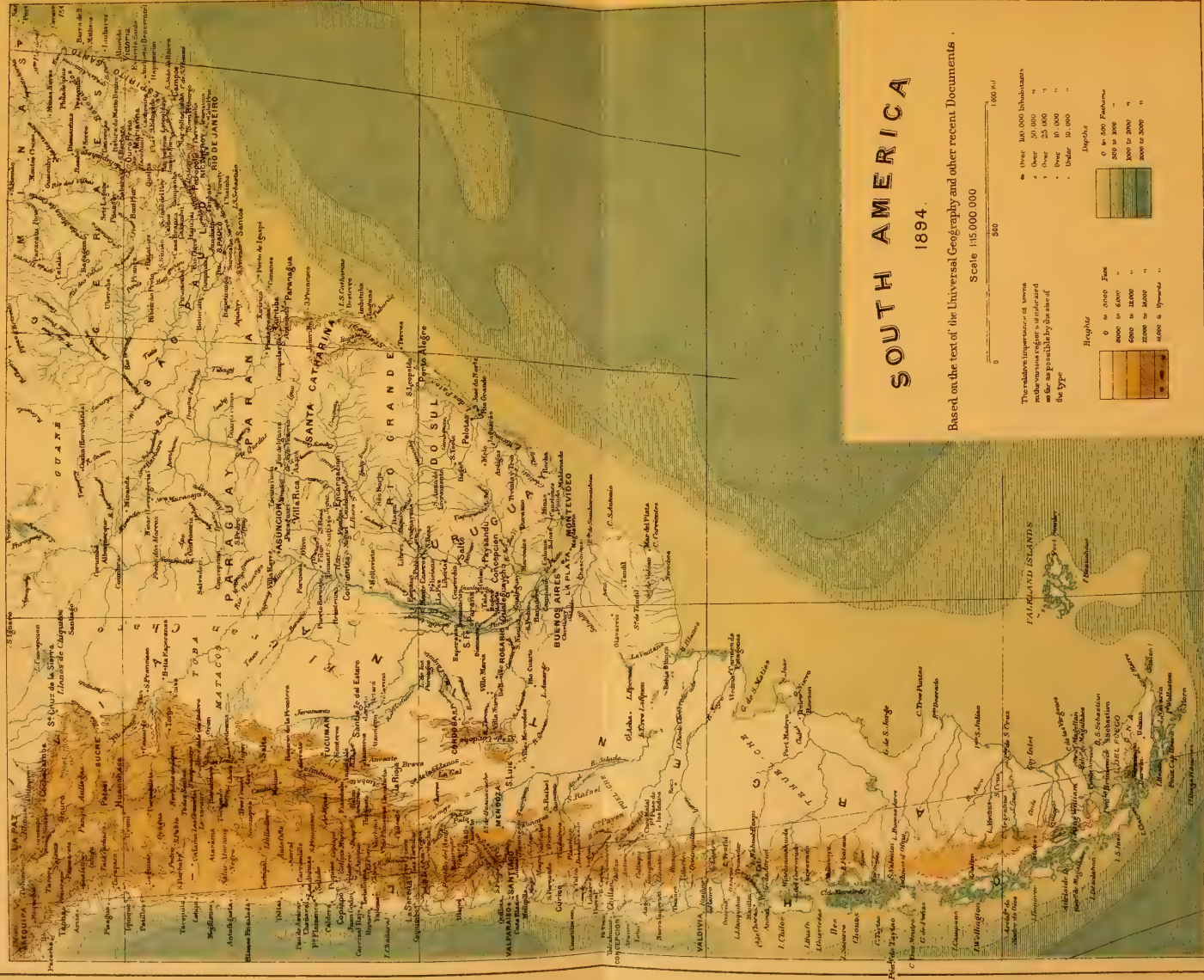
1850 the yellow fever made its first appearance, struck down two-thirds of the inhabitants, and drove the rest to seek safety in flight.

Since then Para has made astonishing progress, the population increasing more than sixfold and the exchanges over tenfold in four decades. All the retail business and a considerable amount of the foreign trade, as well as several of the industries, are in the hands of recent Portuguese immigrants, who here display a great spirit of solidarity.

Although over 60 miles from the sea, the channel at Para is still 23 feet deep, giving access to large vessels, which here ship rubber (the finest in the world), cacao, hides, drugs, Peruvian straw hats, and other produce, in exchange for preserves, breadstuffs, and European wares of all sorts. Most of the exchanges are with the United States, England, and France in the order named.

Round about Para are several little trading places, such as *Vigia*, at the entrance of the estuary; *Salinas*, on the white cliffs facing seawards; *Bragança*, farther east, a watering place now connected by rail with Para; *Cameta*, on a high bluff west of the Tocantins, which is here five miles wide.





SOUTH AMERICA

1894.

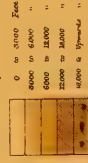
Based on the text of the Universal Geography and other recent Documents.

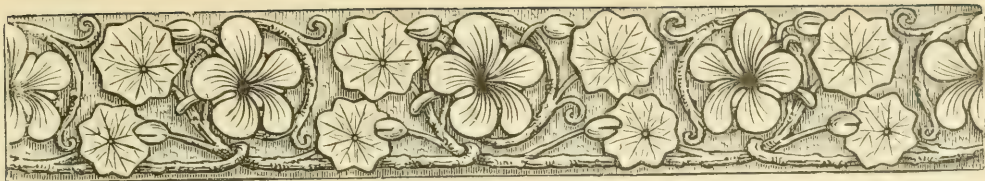
Scale 1:5,000,000

0 500 1000 Kilometers

- over 100,000 inhabitants
- over 50,000 "
- over 25,000 "
- over 10,000 "
- under 10,000 "

Height





CHAPTER VII.

THE TOCANTINS BASIN—STATE OF GOYAZ.



THE Tocantins hydrographic system is closely connected with that of the Amazons. If, as seems probable, a continuous subsidence of the old marine bed has given access to the Atlantic waters, causing them to flood the lands at present occupied by the Amazonian gulf, the Tocantins must at one time have communicated directly with the Amazons through a confluence lying to the east of Marajo Island. It was thus a simple affluent of the great river. In any case it flows from the same slope as the Xingu, the Tapajoz, and the other southern tributaries of the main stream, and its course is developed in the same direction.

But the Tocantins, rising in the very heart of the Brazilian orographic system, is conterminous about the region of its sources with two other large fluvial basins, those of the S. Francisco and the Parana. Hence it has been proposed to found a new capital of the federal republic on this dividing line near the diverging point of three great rivers.

There is no coincidence between the political frontiers of Goyaz and the natural limits of the Tocantins catchment basin. Goyaz, the superficial area of which may be approximately estimated at about 200,000 square miles, occupies south of the Pyreneos divide part of the southern slope draining to the Parana, and towards the west it comprises no more than one-half of the Araguaya Valley; the channel of this river in fact forms its frontier towards Matto Grosso and Amazonia.

The drainage area itself is otherwise very sharply defined. An oval-shaped cirque is developed round the sources of the two main branches—Tocantins and Araguaya—and this cirque is closed northwards by the rocky ridges where are formed the last fluvial cataracts. The outer walls of this vast amphitheatre are formed, if not by distinct mountain ranges, at least by the escarpments of a plateau. Towards the east especially the edge of the basin rises in scarps of bold relief, which have even received the name of *serras* ("ranges"), from the aspect which they present towards the valley. Such are the Serra das Mangabeiras, the Serra do Douro, da Tabatinga, and do Paranan.

In reality these heights consist of *chapadões*, fragments of a sandstone plateau at a mean elevation of 1,300 feet, above which rise at intervals cubic masses about 165 feet higher, with a few intervening depressions of corresponding depth.

The whole region formerly constituted a level plain, whose present inequalities are due to the erosion of running waters. But for a small part of its lower course the Tocantins flows through the alluvial plain which forms an eastern prolongation of that of the Amazons.

AMAZONS AND TOCANTINS BASINS.

The absolutely unknown regions of this basin still comprise a very large portion of its area. It is generally so inaccessible that explorers, amongst whom must be mentioned Francis de Castelnau, Couto de Magalhães, Hassler, and Ehrenreich, have for the most part confined their excursions to the river and its immediate vicinity. Goyaz has also been visited by Pohl and Natterer, and during the eighteenth century a few voyages of discovery were undertaken, although such expeditions were forbidden by the Portuguese Government through its dread of all change. Tavares Lisboa, guilty of having made the descent of the Tocantins as far as Para, was imprisoned with his companions, and had a narrow escape from capital punishment.

Two rivers of equal length, and differing little in volume, unite to form the mainstream. These are the Tocantins, properly so called, and the Araguaya, whose mutual relations may be compared to those of the Loire and Allier in France. Between the two Brazilian as between the two French watercourses there stretches a line of heights sufficiently elevated to assume in some places the aspect of mountains, and collectively forming a distinct geological zone. In Goyaz this zone consists of metamorphic rocks encircled by sandstones.

The farthest sources of the Tocantins or eastern branch escape from an upland valley enclosed by the transverse ridge of the Pyreneos, and are collected in the placid Lake Formosa. They emerge from this basin in the single channel of the Maranhão, which flows first north-west, and then trends round at a right angle to the north-east.

After its junction with a torrent from the Montes Claros, the Maranhão takes the name of Tocantins, which it preserves for the rest of its course to the sea. Its volume is doubled by the Parana (Parana-Tinga, or "White River"), which collects all the streams descending from the western slopes of the Paranan and Tabatinga Mountains.

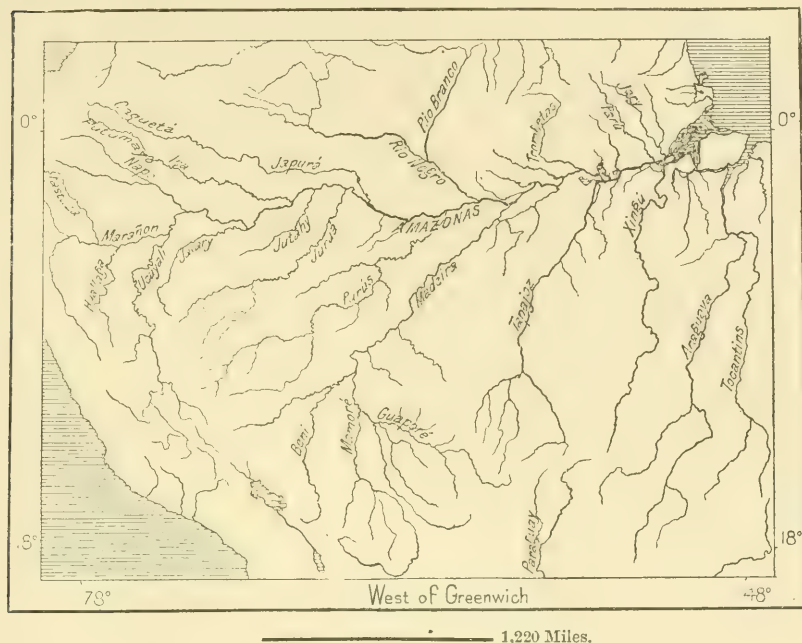
Below the Parana confluence the Tocantins would be accessible to large steamers but for the rocky ledges interrupting its course at several points. Various other affluents follow, nearly all from the eastern slope, amongst them the Rio do Somno, descending from a divide 2,140 feet high, whose waters are discharged through the Sapão to the S. Francisco basin and through the Somninho to the Tocantins. On Homem de Mello's map of 1885, a lakelet on the crest of the divide is even figured as discharging, besides these two emissaries, a third affluent, the Novo, flowing also to the Tocantins.

After its junction with the Manoel Alves Grande the mainstream forces its way by a succession of abrupt changes through a series of rocky barriers, by the northernmost of which it is at last deflected westwards to the Araguaya.

Both as regards the direction of its valley and its volume the Araguaya would appear to be the more important of the twin streams. It rises farther south than the Tocantins, descending under the name of the Rio Grande from the Serra Cayapo, near the sources of some of the headwaters of the Paraguay. Swollen by the Rio Claro and other considerable affluents, it is already a navigable

Fig. 45.—ROUTES OF EXPLORERS IN THE AMAZONS AND TOCANTINS BASINS.

Scale 1 : 35,000,000.



Marañon : Humboldt (1802).

Pastaza; Maldonado (1743); M^o. Godin (1769).

Coca-Napo: Gonzalo Pizarro (1540); Teixeira (1637); Fritz (1686); Villavicencio (1858).

Huallaga : Maw (1827); Herndon (1852).

Ucayali; Castelnau (1846); Gibbon (1852).

Javary; Black and Hoonholtz (1874).

Putumayo-Iça: Juan de Sosa (1609); Reyes (1874); Simson (1876); Crevaux (1878).

Jurua; Chandless (1867).

Caqueta-Japura: Spix and Martius (1820); Silva Coutinho (1884); Crevaux (1878).

Purus; Urbano (1860); Chandless (1864); Labre (1887); Ehrenreich (1889).

Rio Negro-Uaupes-Branco: Santos (1770); Humboldt (1800); Spix and Martius (1820); de Bauve (1833);

R. Schomburgk (1839); Wallace (1861); Stradelli (1881); Coudreau (1885).

Madeira ; Palheta (1723) ; d' Orbigny (1826-1833) ; Castelnau (1845) ; Keller-Leuzinger (1867) ; Selfridge (1878).

Trombetas: Barbosa Rodrigues (1867); Coudreau (1884).

Tapajoz: Langsdorff (1827); Castelnau (1844); Chandless (1862); Barbosa Rodrigues (1872).

Paru : Crevaux (1878-79).

Xingu: Adalbert of Prussia (1842); Von den Steinen (1884-1887).

Jary; Crevaux (1878-79).

Amazons: Orellana (1540); Texeira (1637); Fritz (1690);
Condamine (1744); Spix and Martius (1820); Mont-
ravel (1846); Azevedo (1862); Agassiz, Hartt (1865).

Tocantins: Castelnau (1844); Couto de Magalhães (1884); Hassler (1886); Ehrenreich (1888).

stream before receiving from the west its largest tributary, the Rio das Mortes, called Roncador in its upper course.

Above the confluence the Araguaya ramifies into two branches, which again unite much farther down, thus enclosing the elongated Bananal Island, which has a superficial area estimated at 8,000 square miles.

This island of "banana groves," which is no less than 250 miles long from south to north, appears to be an alluvial lacustrine bed, perfectly level throughout and in the north still strewn with marshes. It is even said to be occupied by an

extensive sheet of water which discharges into the eastern or lesser branch of the Araguaya. Farther north follow two other islands of similar formation skirting the Serra dos Cayapos, which gradually converges on the river, throwing off transverse ridges of gneiss or igneous origin across the stream. Thus are formed the series of cascades and rapids through which the Araguaya descends from the plateaux to the Amazonian plains. In a space of about 18 miles it descends a total incline of 85 feet, and beyond this zone of cataracts the river becomes entangled in rocky gorges, about 500 feet wide, terminating in the Cachoeira Grande ("Great Cataract"), where it falls 50 feet in a distance of 12 miles. Then it pursues a tranquil course to a point where it is abruptly deflected northwards to its confluence with the Tocantins.*

Below the confluence the united stream, which retains the name of Tocantins, is still obstructed by numerous rapids, one of which at the Tauiry rocks completely arrests the navigation except for boats of light draught at high water in March and April. Even below the last falls of Itaboca the channel is interrupted by sunken reefs, so that the regular navigation stops at the ruined fort of Alcobaça, where at low water the river falls to a depth of about three and a half feet. Here it is distant 130 miles from the system of navigable creeks through which it enters the Para estuary. Hence the whole of Goyaz is deprived of all natural communication with the coast, and its two great watercourses require to be supplemented by canals, roads, or railways before they can be of much use in developing the resources of the country.

CLIMATE OF GOYAZ.

To Goyaz a great diversity of climate is imparted by the course taken by the Tocantins from south to north and along a steeply-inclined slope. From the sources of the Araguaya to the Para estuary the river traverses 17° of southern latitude, and there is a total descent of about 4,000 feet between the crest of the divide in the Serra Goyana and the alluvial coastlands. Thus the lower section of the fluvial basin falls within the Amazonian zone and consequently enjoys a hot moist climate, with but slight vicissitudes between diurnal and periodical temperatures, whereas the upland regions naturally present far greater extremes of heat and cold. Under the influence of the normal south-east trades, or of the south-western winds, the glass here falls at times several degrees below freezing-point, especially during the month of August, while the summer heats occasionally exceed 104° Fahr.

A correspondingly high range occurs between day and night when the wind veers round abruptly from one quarter to the other, and differences of 36° or even 46° have been recorded in less than 24 hours. Summer is ushered in with the

* Hydrographic system of the two rivers:—

	Length in Eng. miles.	Drainage area in square miles.	Discharge in cubic feet per second.
Tocantins . . .	1,550	190,000	?
Araguaya . . .	1,250	164,000	?
United Stream . . .	1,740	354,000	350,000 ?

rains which begin to fall in September, and which in the upland Tocantins valleys appear to represent an annual precipitation of nearly 80 inches.

FLORA AND FAUNA.

On the lower Goyaz slopes the selva is developed in a continuous sea of verdure interrupted only by the watercourses ; but on the upland forests it becomes rarer and more open. Here most of the surface is occupied with terraced *campos* (savannas), where arborescent vegetation is represented only by isolated clumps, or *catingas*, that is, groves and thickets interrupted by numerous clearings. In the more fertile regions these *catingas* present the aspect of pleasant parklands, while elsewhere they have a wretched appearance, compared by the white settlers to neglected orchards.

The slopes descending from the sparsely-wooded plateaux to the leafy forest tracts are clothed with a tall herbaceous vegetation. Here certain southern species already indicate the transition between the Amazons and Plate basins. South of the chapadões the plateaux are overgrown with several varieties of the canella de ema (*vellosia maritima*), an extremely picturesque plant with terminal clusters of lovely white flowers protected by pendent fibres like the leaves of weeping willows.

The waters of the Tocantins are frequented by three species of caymans as well as by dolphins. Its upper affluents are said to be inhabited by the *minhoceo*, a prodigious species of lepidosiren, resembling a huge worm, and big enough to drag down and drown large animals. The so-called "ostriches" of Argentina range as far as South Goyaz.

INHABITANTS.

Although their name is perpetuated in that of the region traversed by the Tocantins, the Goyaz or Guayaz Indians are extinct as a separate nation, and their descendants are now merged with tribes of a different origin. At present the most important indigenous people are the Cayapos, who are met also under other names in Matto Grosso and S. Paulo. In Goyaz, where they are said to number about 12,000, they live mostly apart from the settlements in the western mountains between the Araguaya and the Xingu rivers, and in the north-east on the borders of the State of Maranhão.

According to their language and usages, the Cayapos must be grouped with the widespread Ges family, so named by Martius from the final syllable of most of the tribal denominations. But the shape of the head, which is highly brachycephalic, differs from that of all other members of the Ges connection. They are also distinguished by an extremely marked Mongoloid type. Like the kindred Botocudos, the Cayapos wear the *botoque* or wooden disc in the lower lip. But they are much more industrious than the Botocudos, and display great skill in the preparation of arms, instruments, and various other objects.

Other Indians of the same race, known to the Brazilians by the name of Chavantes, dwell in the Araguaya basin, and especially in the region traversed

by the Rio das Mortes. They call themselves *Akué*, and to the same group belong the *Chikriabas* of the divide between the *Paranatinga* and *Paranahyba* rivers, the *Akroas* and *Cherentes* of the Rio do Somno and of the *Tocantins* above the "Two Bars," and the *Apinages*, naked savages of the hilly district between the *Araguaya* and the *Tocantins*. Couto de Magalhães asserts that the *Chavantes* eat their dead children in order to again assimilate them. At Goyaz, Castelnau saw a *Cherent* captive with nearly two hundred scars on his breast indicating the number of men he had killed and eaten. Those on the right side represented the "Christians," those on the left the natives.

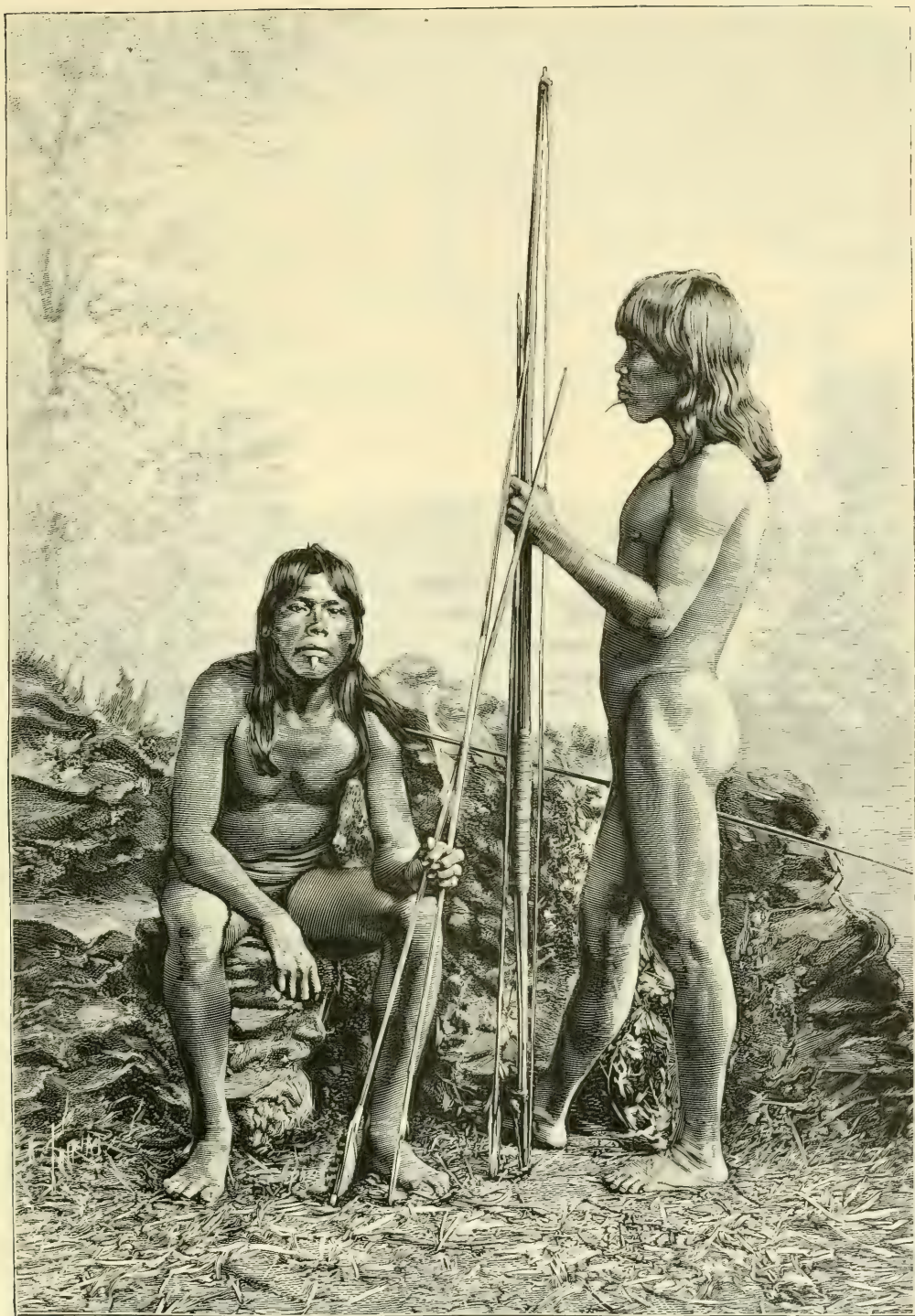
The *Carayas*, who also roam the right bank of the *Xingu*, have their chief tribes on the western slopes of the *Araguaya* valley, in *Bananal Island*, and, east of the *Tocantins*, on the borders of the provinces of *Para* and *Maranhão*. They are regarded as of different stock from the *Ges*, *Tupi*, and *Carib* races, and their polysyllabic language appears to be fundamentally distinct from all other South American tongues. Most of the *Carayas* have very narrow skulls, upturned nose, small and slightly oblique eyes, and much less coarse hair than that of most other natives.

Amongst the numerous *Caraya* tribes, who muster altogether about 4,000 "bows," the *Chamboas* appear to be the most mixed, owing to numerous alliances with the *Cayapos* and the frequent adoption of captive children. The *Carayas* are probably the most skilled craftsmen of all the Brazilian aborigines; they are also expert boatmen, and the tribes formerly known as *Canoeiros* ("Canoe-men") belonged probably to this race. Morally the *Carayas* are distinguished by their sober habits, truthfulness, and contempt of stratagem. Their dead are buried in a vertical position, the head being left above ground, so that they can still be fed with bananas and other food.

In South Goyaz the Negro element was at one time relatively very numerous. But most of the slaves perished without leaving any issue; over 100,000 were said to be employed on the plantations of the *comarca* of Goyaz at the beginning of the nineteenth century, and of these not more than 4,000 were still alive at the time of the emancipation. Hence there is but a slight strain of black blood in the half-caste Brazilian populations of Goyaz, who are chiefly descended from white fathers and Indian mothers. In all the districts where the waters are charged with magnesium goitre is very prevalent amongst these somewhat degenerate mestizoes. Owing to the demoralisation attending the working of gold mines, Francis de Castelnau declares that in his time the country had reverted to "a complete state of barbarism."

TOPOGRAPHY OF GOYAZ.

According to an article of the new republican constitution, the future federal capital is to be founded near the sources of the *Maranhão*, and in 1892 a space of about 6,000 square miles was here marked out as a federal district, the common property of the nation. This region appears to enjoy an excellent climate, and also possesses an abundance of good water, ample for the requirements of the



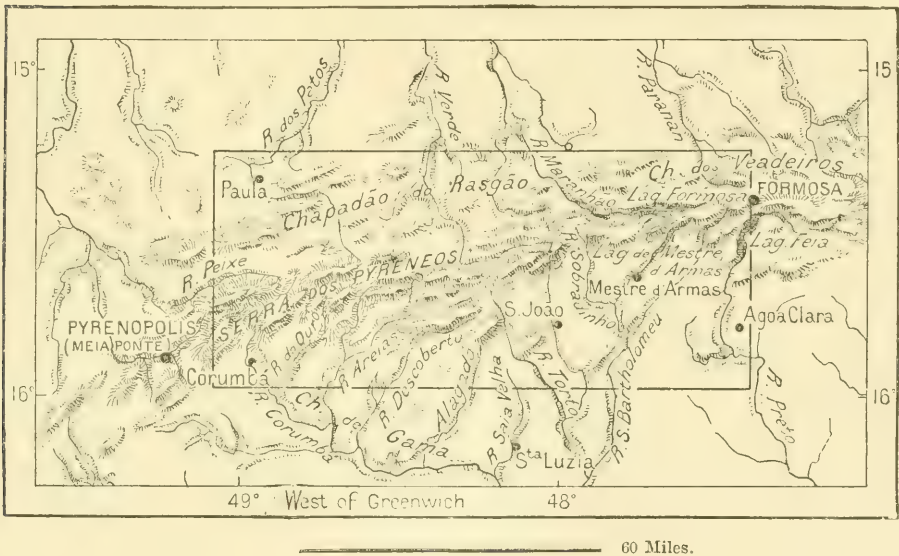
CARAYA INDIANS.

new municipality. The communications are also much easier than had been supposed, for the Pyreneos mountains scarcely rise more than 800 or 1,000 feet above the highest eminences of the surrounding chapadas. The loftiest peak, formerly greatly overestimated, is now known to attain an absolute height of not more than 4,550 feet, which is actually 1,000 feet less than the Chapada dos Veadeiros, near *Formosa*.

Villa dos Couros, as *Formosa* was formerly called, is situated in the neighbourhood of Lake *Formosa*, and forms, with *Meia-Ponte* (now *Pyrenopolis*), one of the two largest centres of population in South Goyaz, although both contain only 2,000 or 3,000 inhabitants. The gold and diamond washings, which formerly attracted numerous adventurers from S. Paulo and Minas Geraes to the *Meia-Ponte* district, are no longer productive since the abolition of slave labour.

Fig. 46.—SOUTH GOYAZ AND FUTURE FEDERAL TERRITORY OF BRAZIL.

Scale 1 : 2,540,000.



Along the Upper Tocantins follow the little stations of *San Felix*, *Porto Nacional*, and *Pedro Affonso*. The last-mentioned is well situated at the confluence of the Rio do Somno, through which is to pass the future railway to Barra on the S. Francisco. But meanwhile the Tocantins basin is practically closed in the direction of the north, except to daring adventurers and explorers.

Goyaz, capital of the State, formerly called *Villa Boa*, lies in the Upper Araguaya valley close to the divide towards the sources of the Tocantins. Although the administrative centre, Goyaz is a smaller place than it was in the eighteenth century, when thousands of black slaves were engaged in the gold and diamond mines discovered in the neighbourhood. In this district the vine is cultivated, and even yields two annual crops, one of which, however, is used chiefly for making vinegar. The Goyaz wines were said to be formerly much appreciated, and the Goyanos now claim for their tobacco, the *fumo picado* leaf, that it is

“the best in the world.” At any rate, it commands the highest price on the Bahia market.

Beyond the important riverine port and military station of *Jurupensen*, 50 miles below Goyaz, follow at long intervals a few other little settlements, such as *Leopoldina*, at the confluence of the Vermelho with the Araguay, and *S. João das duas Barras* at the confluence of the Araguay with the Tocantins. But *S. João de Araguaya*, as it is also called, never can become an important riverside port, the navigation being obstructed by numerous falls and rapids, both above and below this station. Below the last (Itaboca) falls, where the united waters flow with a tranquil navigable current, the Tocantins ceases to belong to Goyaz. Here it enters the province of Para, which it traverses for the rest of its course to the estuary.





CHAPTER VIII.

EQUATORIAL SEABOARD.

STATES OF MARANHÃO, PIAUHY, CEARA, RIO GRANDE DO NORTE, PARAHYBA, PERNAMBUCO, AND ALAGOAS.



BETWEEN the Para estuary and the mouth of the Rio S. Francisco the seaboard is disposed in the direction from north-west to south-east and comprises numerous relatively small river basins, all resembling each other in their general incline, their soil, climate, and products. The whole region presents a transitional character between Amazonia and the more thickly-peopled parts of Brazil, and towards the south it is limited by extensive mountainous solitudes.

Owing largely to the lack of communications all the States of this seaboard are still in a backward condition, and the population averages scarcely more than eight or ten to the square mile—4,320,000 in a total area of about 470,000 square miles. In normal years, when the rainfall is abundant, there is a tendency to increase; but in unfavourable seasons the enterprising people of Ceara emigrate in large numbers to Amazonia, although even this movement has at least the advantage of promoting more intimate relations with the remote provinces of the republic.

GEOGRAPHICAL RESEARCH.

Our knowledge of the interior is also rapidly advancing, thanks to the labours of the engineers and speculators engaged in laying down the traces of future highways or in the quest of mineral treasures. Geographical exploration had already begun in 1594 by the arrival of Jacques Briffault in the island where now stands the town of San Luiz do Maranhão. The missionaries, Yves d'Evreux and Claude d'Abbeville, have left us descriptions of the savages with whom they sojourned in the early days of the discovery, and during the Dutch occupation of Pernambuco (1630—1654), other districts were described by Johannes van Laet, Barlaeus, and Nieuhof.

Various expeditions into the *sertão* for the capture of slaves gradually revealed the trend of the river valleys and mountain ranges; but of the Brazilian regions these have been least visited by naturalists and geographers. In 1809 and the

following years Henry Koster traversed the coastlands between Recife and Maranhão. In 1875 Wells, starting from Carolina on the Tocantins, crossed the mountainous zone, and reached Maranhão by the Rio de Grajahu valley. The coast has also been carefully studied by Vital d'Oliveira and later by Mouchez, both of whose charts serve as bases for the still-defective maps of the interior.

PHYSICAL FEATURES—GEOLOGY.

The coast ranges between the Tocantins and the S. Francisco basins constitute no continuous chains with regular watersheds; they are evidently the remains of elevated plains eroded by running waters, although the crests may still enable geologists to divine the original structure of the ravined plateaux. The loftiest ridges appear to be the Serra do Piahy and the Serra dois Irmãos, which dominate the course of the S. Francisco on the north-west. These crests, running south-west and north-east, may be regarded as the edge of a plateau, another edge of which is formed in the south-west by the Serras Mangabeiras and Gurgueia. Some of the peaks exceed 3,000 feet, although the highest measured by Wells between the Tocantins and the streams flowing to the Gulf of Maranhão only attained an elevation of 2,100 feet.

Little is known of the geological structure of these uplands. The escarpments inclined towards the S. Francisco consist of archæan rocks analogous to those of Canada, and to the same formation belong the heights on the projecting coastland between Ceara and Alagoas; but farther west these primitive rocks underlie calcareous strata of the chalk ages. The whole of the Upper Parnahyba valley is occupied by these formations, while farther north, parallel with the coast, follow sandstone terraces like those of Amazonia, doubtless dating from the same period when arenaceous sediment was deposited on the bed of a vast fresh-water Mediterranean.

At that time the Amazonian gulf formed dry land, and the same agencies are still at work eating away the present seaboard. Between the Para and Maranhão estuaries, a distance of about 300 miles, land and water are continually battling for a tolerably broad belt of creeks, inlets, islands, reefs, channels, and lagoons, intermingled in endless confusion and shifting with every tide. Here the bore rushes in with tremendous fury, at times with a velocity of six miles an hour, a veritable tidal cataract tearing the beach into shreds and sweeping away all obstacles. But in this ceaseless struggle the advantage remains with the ocean. Along the strand beds of marine organisms are found superimposed on shell mounds of lacustrine origin; the aquatic mangrove is encroaching on the land flora, and here and there clumps of palms are seen already invaded by the surging waters.

RIVERS.

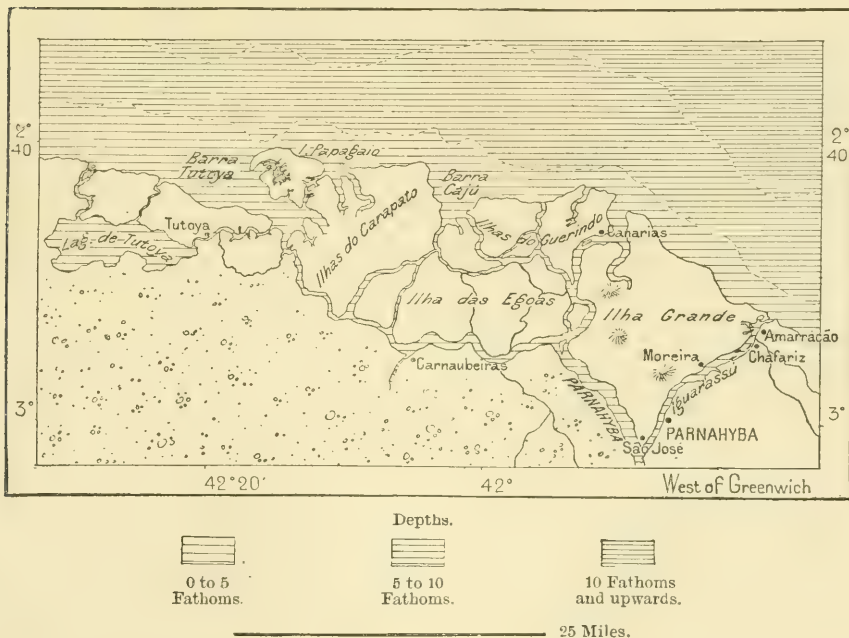
Numerous streams descend from the hills and plateaux of the Atlantic watershed; but no river, not even the Parnahyba, rivals the great Amazonian affluents in the length of its course. The Gurupy, flowing between the States of Para and

Maranhão, is scarcely known except as a frontier stream. The more copious Grajahu, swollen by the Mearim on the right and by the Pindaré on the left bank, enters the sea through a broad estuary in which is situated the island of S. Luis de Maranhão. The Itapicuru, so named from the mountains where it rises, falls into the same estuary, and is the largest river in the State of Maranhão, accessible to small steamers for 340 miles from its mouth.

The Parnahyba, or "Bad River," if such be the true meaning of the word, owes its evil reputation, perhaps, to its unhealthy valley, or more probably to the difficult and dangerous navigation of its shallow bed. Yet in length and the extent of its drainage area it surpasses all the rivers of West Europe. During an upper course of over 370 miles it receives all the waters descending from the

Fig. 47.—PARNAHYBA DELTA.

Scale 1 : 1,000,000.



northern slopes of the divide—Mangabeiras, Gurgueia, Piahy, and Dois Irmãos. But, unlike the Amazons, it enters the sea, not through an estuary, but through a ramifying delta advancing far beyond the normal coastline.*

The Jaguaribe, which collects nearly all the running waters of Ceara, is far less copious than the Parnahyba, and, despite its numerous affluents, is navigable only for 15 miles of its lower course. In 1815 its mouth was completely closed by the bar, and all the shipping were caught like fish in a net.

From the mouth of the Parnahyba to that of the S. Francisco the coast is fringed by a reef, or by several perfectly regular lines of reefs, some of coralline, some, notably the famous Pernambuco reef, of different origin. Probably in the whole world there exists no other natural formation which has more the appear-

* Length of the Parnahyba, 930 miles; drainage area, 136,000 square miles.

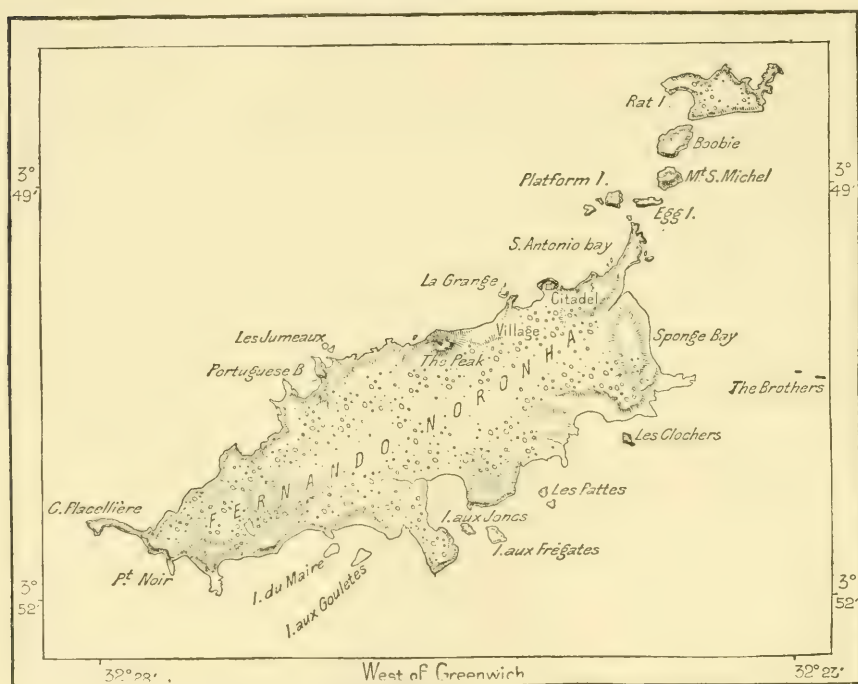
ance of being the work of man. Its mean breadth ranges from 100 to 200 feet, and the flat top remains exposed at low water. The rock consists of a compact sandstone, which probably represents a range of dunes deposited by the water, consolidated by calcareous substances and gradually covered with an extremely hard coating of various animal and vegetable organisms. It resists the action of the waves, and the oldest pilots detect no change in its general outlines.

FERNANDO DE NORONHA.

The eastern extremity of the continent, indicated by the headland of S. Roque, is continued for a great distance seawards by a submarine plateau about 56 miles

Fig. 48.—FERNANDO DE NORONHA.

Scale 1 : 100,000.



On the Maps the place names differ with the nationality of the surveyors.

2 Miles.

broad. Here is the edge of the continental pedestal, where the water rapidly deepens from 30 or 40 to 1,500 and even 2,000 fathoms. The first land visible in this direction is the annular enclosure of las Rocas, a true coralline atoll, like those of the Indian Ocean, enclosing a lagoon about six miles in circumference.

About 110 miles farther east is seen the volcanic island of Fernando de Noronha disposed south-west and north-east, and separated from the continent by depths of 1,500 fathoms. This land, which takes its name from the mariner who discovered it in 1503, occupies a space of no more than six square miles; but within these narrow limits is seen the most varied scenery, creeks, and havens, hills and

plains, even some bold peaks, the whole terminating westwards in an abrupt cliff 1,000 feet high, surmounted by a phonolithic column in the form of a colossal lighthouse.

The governor of the island refused the naturalists of the *Challenger* permission to explore it; but since then it has been studied by the geologist Branner and the zoologist Ridley, and it is now well known. The basalts of which it largely consists are of ancient date, and since the discovery no eruption has taken place. The lava flows occurred at a time when the island was submerged to a depth of about 75 fathoms, as shown by the cakes of coral attached to the basalt columns at this height above the sea.

The other islets lying in mid-Atlantic on the same axis as Fernando de Noronha are jagged serpentine rocks, flecked with patches of white guano and almost inaccessible. Penedo de S. Pedro, highest of these reefs, lying near the track of the steamers plying between Pernambuco and Saint Vincent, presents the aspect of a row of pillars rising abruptly above the surface. In these waters sea-quakes are a frequent phenomenon.

CLIMATE.

In these tropical lands the mean temperature varies little throughout the year, at Pernambuco not more than 3° Fahr. between the wet and dry seasons. Even the average lowest (July) and the average highest (February) show a range of only about 5° or 6° Fahr.

On the north-east coast the normal wind is the south-east trade, usually called the "general wind." Coming from the circumpolar Antarctic regions, it tempers the heats, at least on the seaboard, and also coincides with the wet season from December to June, when the rainfall in ordinary years suffices to nourish an exuberant vegetation. Some districts, such as Maranhão, are exposed to frequent thunderstorms, followed by heavy downpours. But at Pernambuco, although the rains are very heavy, whole years sometimes pass without any electric discharges. Even the rains themselves are often delayed, or cease to fall before the end of the normal wet season. The droughts which ensue, especially in the interior, are accompanied by great changes of temperature, which is very high during the day in an atmosphere charged with dust, and relatively low during the clear nights owing to the excessive radiation. In this respect there is a great contrast between the climate of the coastlands, where two out of three days are rainy, and that of the inland districts, where the proportion is reversed.*

FLORA AND FAUNA.

The vegetation, corresponding with the climatic differences, is extremely rich, and presents the same species as Amazonia on the well-watered coastlands, and

* Meteorological contrast between the coast and the *sertao* (interior):—

	Latitude.	Temperature.			Rainfall.
		max.	min.	mean.	
Coast—Recife . .	8° 3' S.	89° Fahr.	64° Fahr.	78° Fahr.	120 inches.
Sertão—Sta. Izabel .	8° 46' S.	93° Fahr.	56° Fahr.	76° Fahr.	40 „

becomes gradually poorer towards the interior. To the *matta*, or forest zone of the seaboard, succeeds the *catinga*, a more open or scrubby district, which merges higher up in the *agreste*, where trees and shrubs become rarer, and consist of species which shed their leaves in summer. Lastly comes the *sertão* of the arid uplands, with poor pasturage, where stock-breeding is the only possible industry, except in the *brejos* or combes, marshy or fed by springs, forming so many oases in the wilderness.

In these dry inland regions the prevailing species are the gummiferous or aromatic plants, whose foliage is deciduous in the summer season. The characteristic palm is the carnauba or wax-tree (*copernicia cerifera*), one of those useful plants which supply the natives with all their wants—food, drink, light, clothes, and habitations.

Formerly the fauna of Ceara and neighbouring districts was very rich, and at the beginning of the seventeenth century the “ostrich” (rhea) still roamed the coastlands opposite the island of Maranhão. In the limestone caves of the Maranhão, Piahy, and Ceara mountains, frequented by myriads of bats and vampires, the remains have been found of huge extinct mammals, such as the mastodon and the megatherium. Even Fernando de Noronha had its special fauna, represented by a large species of rat, birds, lizards, snakes, insects, and shells, showing that the island had been separated from the mainland since the close of the Mesozoic epoch.

INHABITANTS.

One of the caves in the valley of the Quixeramobim affluent of the Jaguaribe contained part of a human skull evidently of great antiquity. But it is uncertain whether it belonged to an ancestor of any of the dominant races—Tupi, Tupinamba, Tupinambux, that is “Brave Men,” or Tabajara, “Village Lords”—with whom the first French settlers in Maranhão entered into friendly relations during the sixteenth century. Nor has any knowledge survived of those Indians who formed alliances with the French immigrants, all having long been merged in the general Brazilian population.

Although the Guajajaras of the Pindaré valley were exterminated by the gold-hunters, some of this race are still met at the sources of the Upper Grajahu. They are a vigorous people of Mongolic type, and the neighbouring “White Indians” are remarkable for their light complexion. Farther east, on the higher parts of the plateau, there still survive some fragments of distinct tribes, such as the Akroas and Cayapos between the Tocantins and the Grajahu, in the Serra da Cinta and the Serra do Negro. These natives, who appear to be of Ges stock, approach the coastlands in West Maranhão, where they are known as Timbiras and Gamellas, the latter term having reference to their “lip disk.”

On the Piahy and Pernambuco borderlands still roam a few scattered bands of the Pimenteiras, whose speech shows traces of Carib affinities or contact. In the sixteenth century the Caethes of the Pernambuco district had already begun to amalgamate with the Europeans, who were later again crossed with the slaves

imported from Africa. In the beginning of the seventeenth century a revolt broke out among the negroes, a few of whom, having obtained some firearms, took refuge in the bush, where they founded *quilombos* or settlements on the Rio Una ("Black River"), which reaches the coast some 60 miles south of Pernambuco. A larger group of these runaways established themselves in the present State of Alagoas, where they soon became powerful enough to found a little republic, whose capital, Palmares, had a population of 6,000, and traded with Pernambuco. But the planters, alarmed at the flourishing state of this community of freemen, organised an expedition against them, and, after a first failure, captured Palmares and distributed the inhabitants over the plantations.

Amongst the populations of this seaboard those of Ceara enjoy throughout Brazil a high reputation for energy and enterprise. Like their neighbours they are a blend of three distinct stocks, retaining the endurance, tenacity, and cunning of the Indians, the buoyancy, impulsiveness, and kindness of the negroes, the intelligence and strength of the whites. They are often driven by the long droughts to seek employment elsewhere, and mainly to the immigrants from Ceara is due the growing prosperity of Amazonia. They number at present nearly 20,000.

TOPOGRAPHY—TOWNS OF MARANHÃO.

Turyassu, on a marine inlet near the Rio Turyassu in the State of Maranhão, exports sugar and other agricultural produce, besides hides, horses, coarse crockery, and costly hammocks. South-west of this place, between the Gurupy and Maracassumé rivers, stands the little group of the *Montes Aureos* ("Gold Hills"), which, however, are almost entirely neglected; nor has any attempt been made to work the copper ores discovered in the Maranhão Mountains.

On the east coast beyond Turyassu follow *Cururupu* and *Guimarães*, the latter a great centre of the sugar industry. But the largest place on the coast between Para and Pernambuco is *S. Luiz de Maranhão*, or simply *S. Luiz*, built on the site of the settlement founded in 1610 by La Revardière, and named in honour of Louis XIII. Standing on the west side of a low island separated by the Mosquito creek from the mainland, S. Luiz commands the two estuaries, which reach S. Marcos bay farther west. This bay is accessible to vessels of heavy tonnage, and the harbour, although gradually silting up, has developed a considerable export trade in sugar, hides, and coffee. All the coast steamers call at S. Luiz, while small craft ascend the Pindaré, Grajahu, and other streams flowing to the bay.

In the district are several small places, such as *Alcantara*, noted for its cacaos; Vianna, on a lake draining to the Rio Pindaré; *Monção*, higher up on the same river, centre of a brisk trade in live stock brought from the interior and even from the Tocantins basin. A railway has long been projected to run from the coast near S. Luiz up the Grajahu valley to the banks of the Tocantins with a station at *Carolina* at the mouth of the Manoel Alvez Grande.

On the Itapucuru, which traverses the eastern part of Maranhão, the chief place is *Carias*, native town of Gonçalves Dias. In the district cotton and other

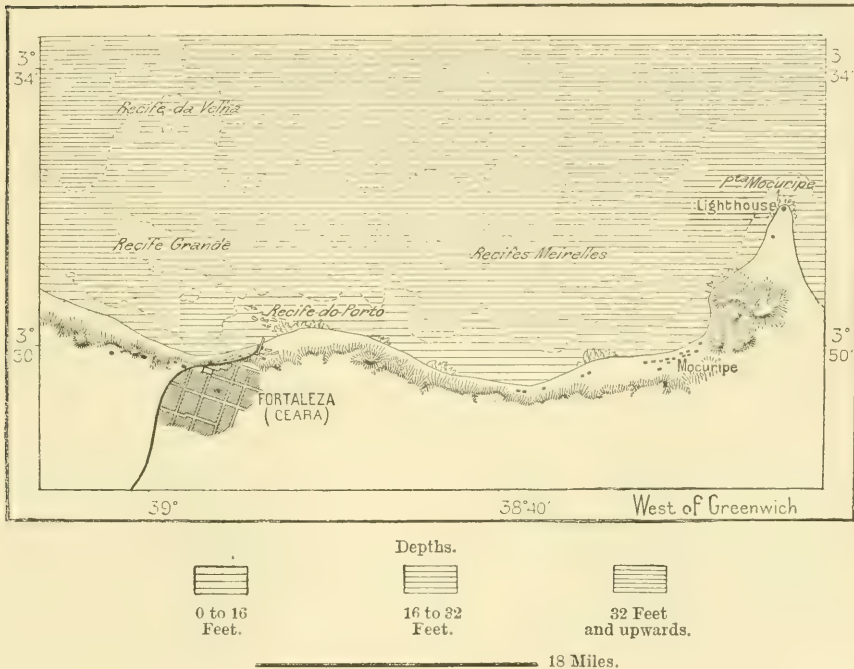
Maranhão, it will soon be connected by rail with Caxias in the Itapucuru valley. Since it has ceased to be the administrative centre, *Oeiras*, the old capital, in the Rio Caninde valley, has lost most of its inhabitants.

Below Therezina follow several trading places, such as *União* on the right, *Curralinho* and *S. Bernardo* on the left bank. Towards the mouth of the Parnahyba, only the eastern part of the delta is comprised in the State of Piahy, whereas in the interior its territory stretches some 300 miles west and east. On the narrow Iguarassu branch of the delta stands the port of entry, *Parnahyba*, surrounded by unhealthy alluvial lands. *Amarração*, at the mouth of the same channel, and just within the bar, is the port of call for passing steamers.

Camocim, another port lying farther east at the mouth of the Rio Coreahu in

Fig. 50.—CEARA.

Scale 1 : 800,000.



the State of Ceara, exports hides and agricultural produce. This place is now connected by rail with *Granja*, higher up the same river, and with *Sobral* in the Acaracu basin. Although some of the affluents of this river wash down auriferous sands, the gold industry has not flourished, and this part of Ceara is occupied almost exclusively with stock-breeding.

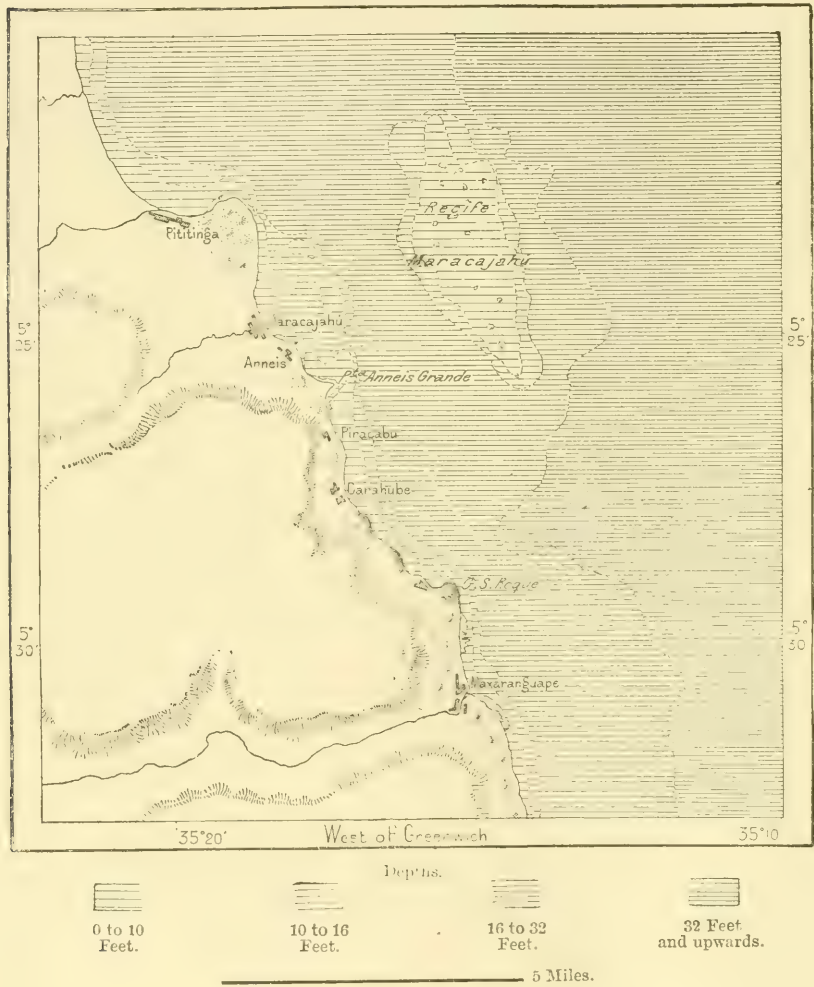
Fortaleza (Ceara), capital of the State, lies not on a fluvial estuary, but about seven miles west of the little Rio Ceara, which gives its name to the State. The roadstead is sheltered on the east by the Mucuripe Peninsula; but a fringing reef prevents the approach of large vessels, which have to ride at anchor farther out, and land their cargoes by means of *jangadas*, or rafts rigged with sails. *Fortaleza* is surrounded by arid, sandy plains, and has to depend on artesian wells for its

water supply. During long droughts the population is sometimes doubled by refugees from the country. In 1878 it was thus suddenly increased to nearly 60,000, of whom 23,250 were carried off in two months by small-pox, famine, and privations of all sorts.

To give employment to the sufferers the tortuous railway was taken in hand and completed in eighteen months, which now ascends from Ceara by an extremely

Fig. 51.—CAPE S. ROQUE.

Scale 1 : 200,000.

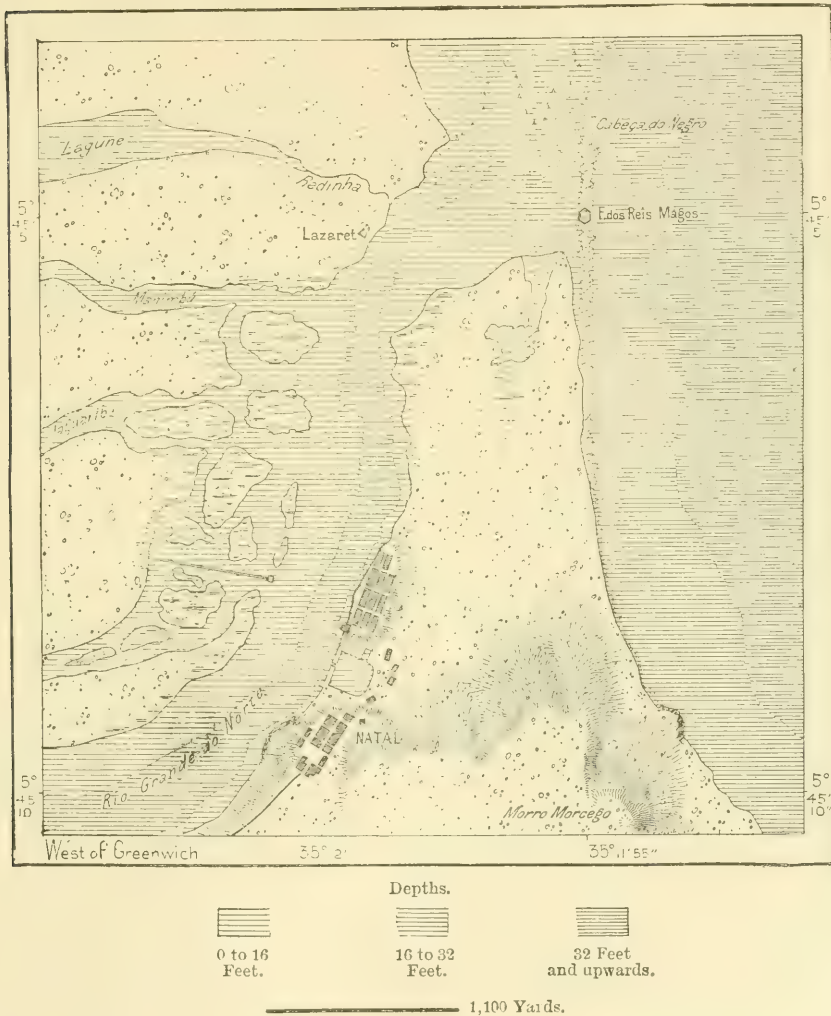


steep gradient over the rocky hills some 60 miles southwards to the town of *Baturité*. A branch line runs westward to *Maranguapé*, noted for its oranges, vast quantities of which are now exported to England. Ceara itself forwards cotton, the wax of the carnauba palm, caju wine, goat skins and ox hides. Ceara was the first place to get rid of slavery, which had to be abolished because the people were liberating the slaves by force, sheltering them, and plundering the plantations.

The Rio Jaguaribe basin, comprising all the southern and eastern parts of Ceara, possesses most of the towns, amongst others *Crato*, *Jardim*, and *Lavras* on the uplands; *Ico* and *Igatu* in the lower valleys; *Quixeramobim* and *Quixada* on the Rio Quixera affluent. At Quixada the Fortaleza-Baturité railway enters the Jaguaribe basin, thus attracting to the capital the trade of these important districts. At present the natural outlet for the settlements on the Lower Jaguaribe

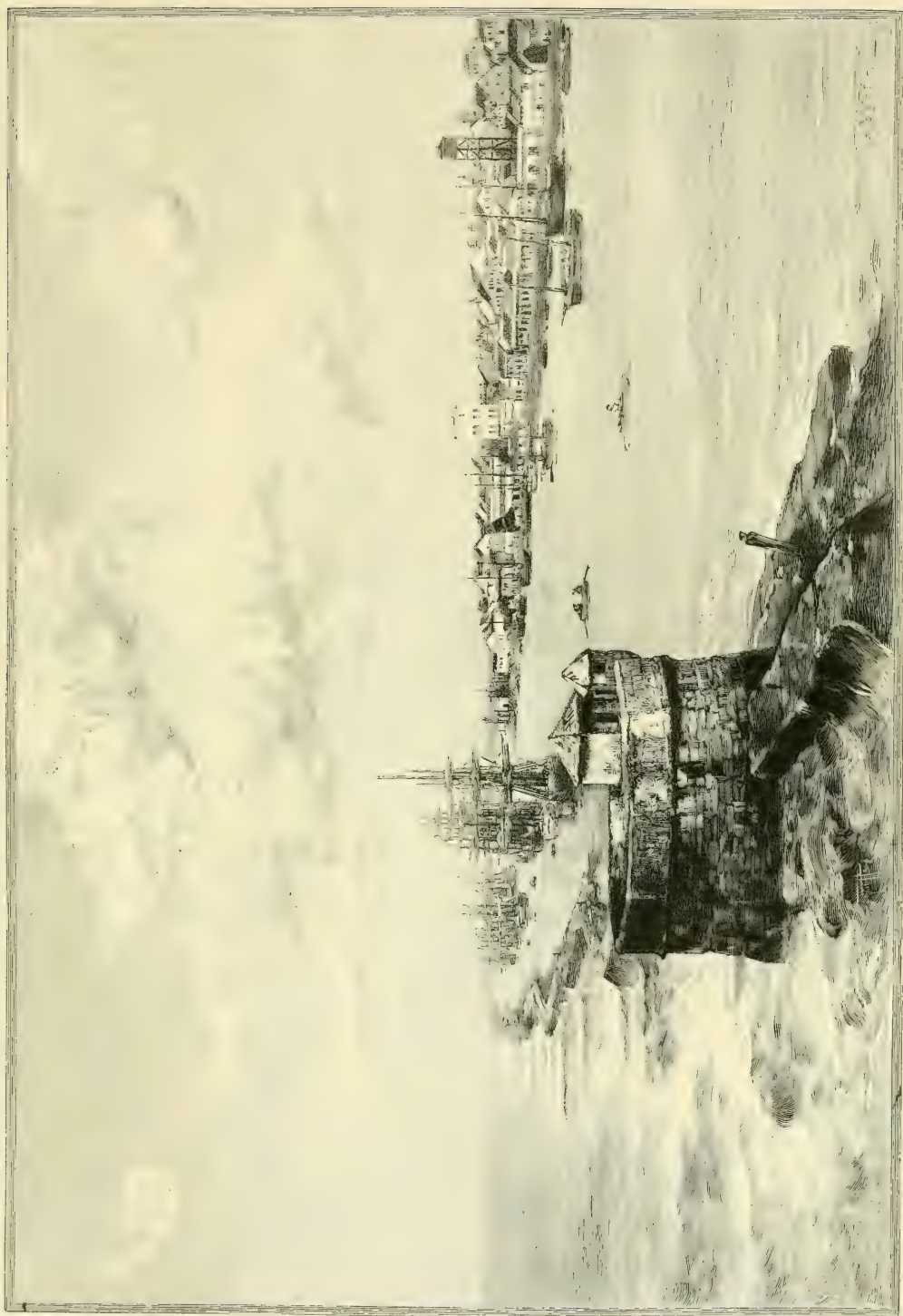
Fig. 52.—NATAL.

Scale 1 : 40,000.



is the port of *Aracaty*, on the right bank of the river, 11 miles above its mouth. A brisk trade is here carried on in agricultural produce and in such local articles as mats, straw hats, and vegetable-wax candles.

The trade of that part of east Ceara which lies west of Cape S. Roque is also partly directed towards the port of *Mossoro* (*Santa Luzia*), in the neighbouring State of Rio Grande do Norte. This town, which lies on the left bank of the



PORT OF RECIFE.

and farther south *Canguaretama*, *Nova Cruz*, and *Penha* in the Rio Curimatahu valley.

In the State of Parahyba do Norte the port of *Mamanguapé*, on the river of like name, still does a little coasting trade, although the city of *Parahyba* has attracted most of the traffic by the construction of a railway penetrating to *Independencia* on the Upper Mamanguapé, and tapping the neighbouring serra with its numerous agricultural settlements, such as *Bananeiras*, *Brejo d'Areia*, and *Alagoa Grande*. In the southern part of the State, *S. João de Cariry*, *Campina Grande*, *Inga*, and *Pilar* have their natural outlet in the estuary of the Rio Parahyba do Norte, on the right bank of which stands the city of *Parahyba*. On the heights is the *Cidade Velha* ("Old Town"), founded in 1579, now a group of almost abandoned monasteries; lower down is the *Varadouro* ("Marina"), the business quarter about 18 miles above the entrance of the estuary, where the shipping is arrested by the reefs and where the northern extremity of the peninsula is crowned by the fortress of *Cabedelo*.

TOWNS OF PERNAMBUCO AND ALAGOAS.

South of Parahyba, the ancient city of *Goyana*, already a flourishing place in the time of the Dutch occupation, holds an analogous position on the bend of a river, which towards its mouth expands into an estuary, but which is also half closed by a barrier of reefs.

Goyana lies in the State of Pernambuco, that is, *Parana-mbuk*, "Sea River," so named in reference to the semi-circular channel which enclosed the island of *Itamaraca*. This island is one of the most densely-peopled districts in Brazil, and produces much sugar, abundance of provisions, and "the best fruits on the sea-board." So early as 1630, as many as 23 sugar-works had been established in *Itamaraca*, whither the Dutch at one time thought of removing the seat of their Brazilian colony.

Pernambuco, capital of the State, takes its official name of *Recife* from the "reefs" which shelter its harbour like natural breakwaters. It is one of the historical cities of the New World, and a commercial emporium which seems destined to a great future. Founded in 1503, by Duarte Coelho, it became the seat of administration under the Dutch at the time when they were masters of north-east Brazil. A few remains of their establishments are still visible at Recife and in the island of Antonio Vaz at *S. Antonio*, formerly *Mauricea* (*Mauritsstad*), so named in honour of Maurice of Nassau.

Under the name of Pernambuco are comprised several distinct urban groups, such as *Olinda*, the former capital, on an eminence over four miles from the commercial centre, a group of crumbling palaces and convents north of the roadstead. On the mainland the country seats, gardens, and farmsteads of *Campo Grande* connect the old and new quarters, while Recife, properly so called, covers the island nearest to the outer reefs with its public buildings, depôts, and warehouses, and is itself connected by bridges with the more southerly and larger island of *Antonio Vaz*. Other causeways connect this central quarter with that of *Bôa Vista*, which

lies to the west on the mainland, and is continued by suburbs in various directions. Numerous villas are scattered north-westwards along the banks of the Rio Beberibe, and westwards in the sinuous valley of the Rio Capibaribe and neighbouring heights.

Beyond the reefs the open roadstead offers bad anchorage to the large steamers

Fig. 54.—PERNAMBUCO.

Scale 1 : 40,000.



and other shipping, which are often driven on the rocks by the southern and easterly gales. Fortunately storms are rare, and even at low water the channel gives access to vessels drawing 15 feet. They first enter the Poço, which is the deepest part of the harbour, and are thence distributed over the well-sheltered natural basin of the Mosqueiro. The engineer, Fournié, proposes to improve the dangerous approaches by running a pier nearly half a mile long from the south

side of the channel eastwards to deep water, thus enabling large vessels to load and unload at all states of the tide and in all weathers. Hawkshaw proposes a somewhat similar plan, but with longer and more crescent-shaped pier.

Fig. 55.—PERNAMBUCO—STREET VIEW.



Either project would make Pernambuco one of the best harbours in Brazil. But its admirable position near the north-east angle of the continent has already

made Recife the chief point of attraction for vessels coming from North America, Europe, and Africa. No part of the Brazilian seaboard possesses more strategical importance. It forms the advanced bulwark of the republic, and in the near future Pernambuco promises to become the most frequented port in South America,

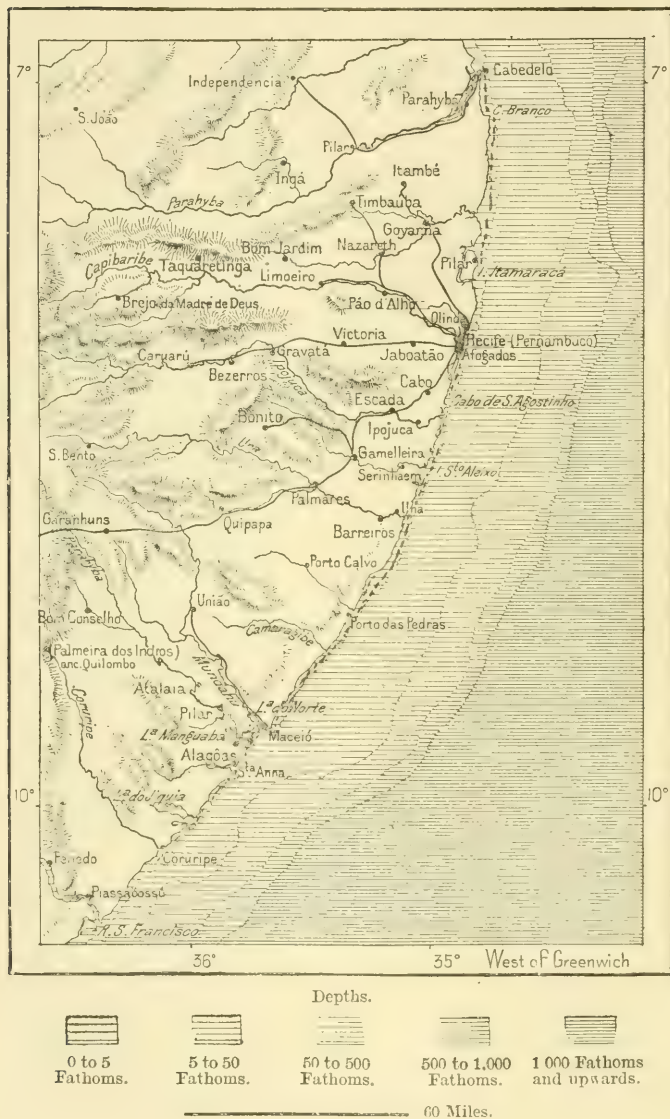
especially for the passenger traffic between the Old and New Worlds.

Three trans-Atlantic cables radiate from Recife, which is the port of call for twelve lines of steamers, while hundreds of other vessels here ship cotton, coffee, sugar, tobacco, hides, skins, the dyewoods formerly known as "pernambucs," natural history collections, and other objects. Great Britain takes the largest share of this traffic, France, Germany, and the United States following in the order named. Pernambuco is the seat of a geographical institute and other learned societies.

Numerous carriage roads and three railways radiate to the surrounding towns—*Iguarassu* in the north; *Pão d'Alho* in the north-west at the bifurcation of the rail-

Fig. 56.—FRINGING REEFS BETWEEN PARAHYBA AND THE MOUTH OF THE S. FRANCISCO.

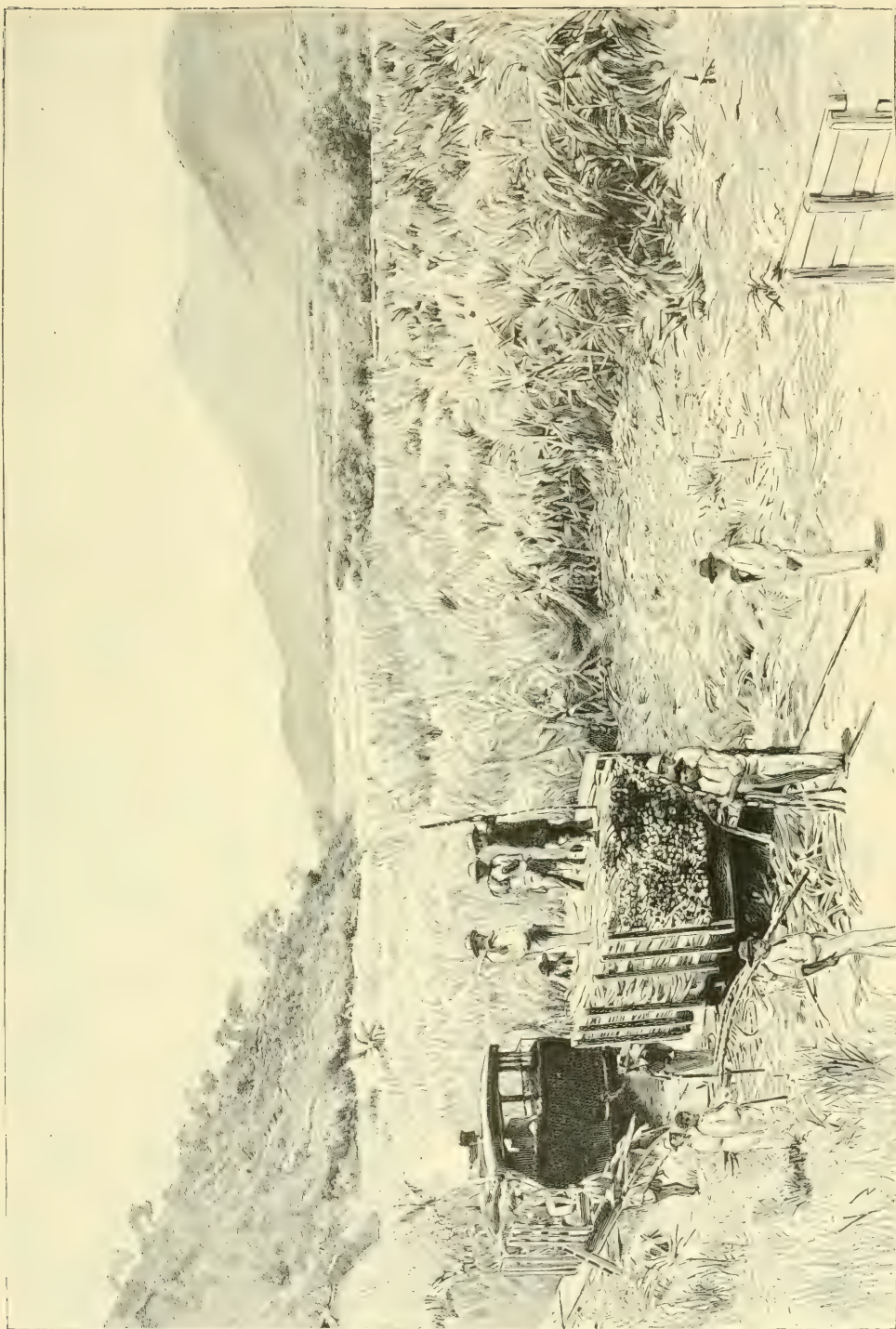
Scale 1 : 3,500,000.



ways running one towards *Nazaré*, the other towards *Limoeiro*, two busy trading places surrounded by sugar-works. *Limoeira* is the chief place in the Rio Capibaribe valley, where are also situated *Bom Jardim*, *Taquaritinga*, and *Brejo da Madre de Deus*.

The railway running west of Recife towards the Upper Ipojuca valley succe-

SUGAR HARVEST.

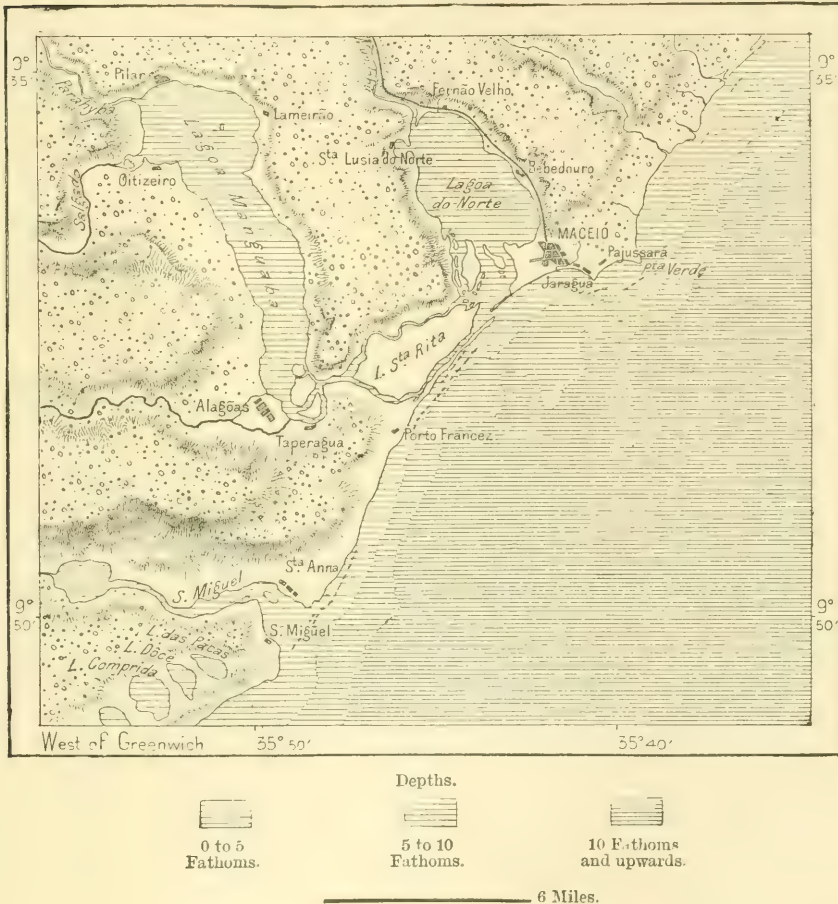


sively passes the stations of *Jaboatão*, most frequented rural resort of the citizens of Pernambuco, *Victoria*, *Gravatá*, *Bezerras*, *Caruarú*, the most flourishing mart in the interior of the State. South-westwards the chief station on the S. Francisco line is *Cabo*, which takes its name from the neighbouring Cabo ("Cape") Santo Agostinho, where formerly stood a fort hotly contested by the Dutch and Portuguese during the first half of the seventeenth century.

Beyond Cabo on the same line follow, still within the State of Pernambuco,

Fig. 57.—ALAGOAS COAST.

Scale 1 : 375,000.



the towns of *Palmares* and *Garanhuns*, the latter a health resort 2,810 feet above sea-level, much frequented by consumptive patients. It lies in the valley of the Upper Mundahu, above the zone of sugar-cane, in a fertile district growing cotton, coffee, tobacco, and cereals.

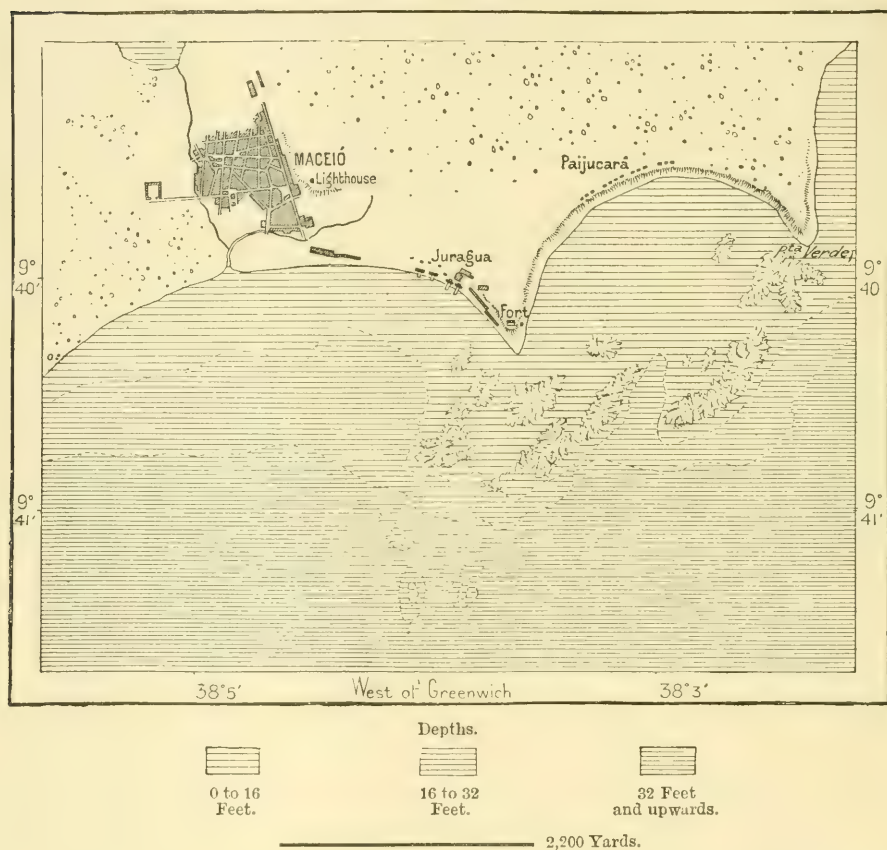
The western section of the State of Pernambuco and the whole of Alagoas (the "Lagoons") are comprised within the S. Francisco basin. But *Maceio*, capital of the latter, stands on a peninsula between the sea and one of the lagoons from which the State takes its name. The Lagoa do Norte, as this basin is called,

receives the Rio Mundahu, while the Manguaba lagoon farther south is fed by one of the numerous streams bearing the general name of Parahyba.

Here the pleasant town of *Maceio* with its suburb of *Juraguá* is shaded with groves and avenues in which are intermingled the African date with the Indian coconut palm. Unfortunately the harbour, though protected from the east and north winds, is exposed to the southern gales, during the prevalence of which the shipping has to take refuge farther east in the roadstead of *Pajussara* under the shelter of the *Ponta Verde* and a chain of reefs. Cotton, sugar, and caju wine are

Fig. 58.—MACEIO AND ITS ROADSTEAD.

Scale 1 : 60,000.



amongst the exports. Maceio receives much of its supplies from the railway which runs north-westwards up the Mundahu valley to *União*, one of the numerous places which during the Empire bore the name of *Imperatriz* in honour of the "Empress" of Brazil.

The Rio Parahyba valley, which is disposed south-east parallel with that of the Mundahu and connected with it by a branch line, abounds in sugar plantations in the municipalities of *Victoria*, *Villa Viçosa* (formerly *Assemblea*), *Atalaia*, *Pilar*, and *Alagoas*. The last-mentioned, which was capital of the State till 1839, stands near the southern extremity of the Manguaba lagoon. It is much less

favourably situated for trade than Maceio, the present capital. Small steamers ply regularly on the creeks and the neighbouring Lake Manguaba between the towns of Maceio and Pilar. At the latter place they ship the cotton brought to the coast from the surrounding plantations.

Fernando Noronha, which belongs administratively to the State of Pernambuco, is a natural dependency of the north-eastern provinces of Brazil. It has no towns or any colony of free settlers, being entirely set apart by the federal government as a convict station. The island is so infested by rats and mice that the convicts, who are employed at certain times in hunting them down, sometimes kill as many as 20,000 in a single day. In the year 1893 a project was brought forward to establish a quarantine and a signal station on the island. The deposits of phosphates have not yet been worked, although some guano has been collected on some of the neighbouring rocks and islets.





CHAPTER IX.

S. FRANCISCO BASIN AND EAST SLOPE OF THE PLATEAUX.

STATES OF MINAS GERAES, BAHIA, SERGIPE, AND ESPIRITO SANTO.



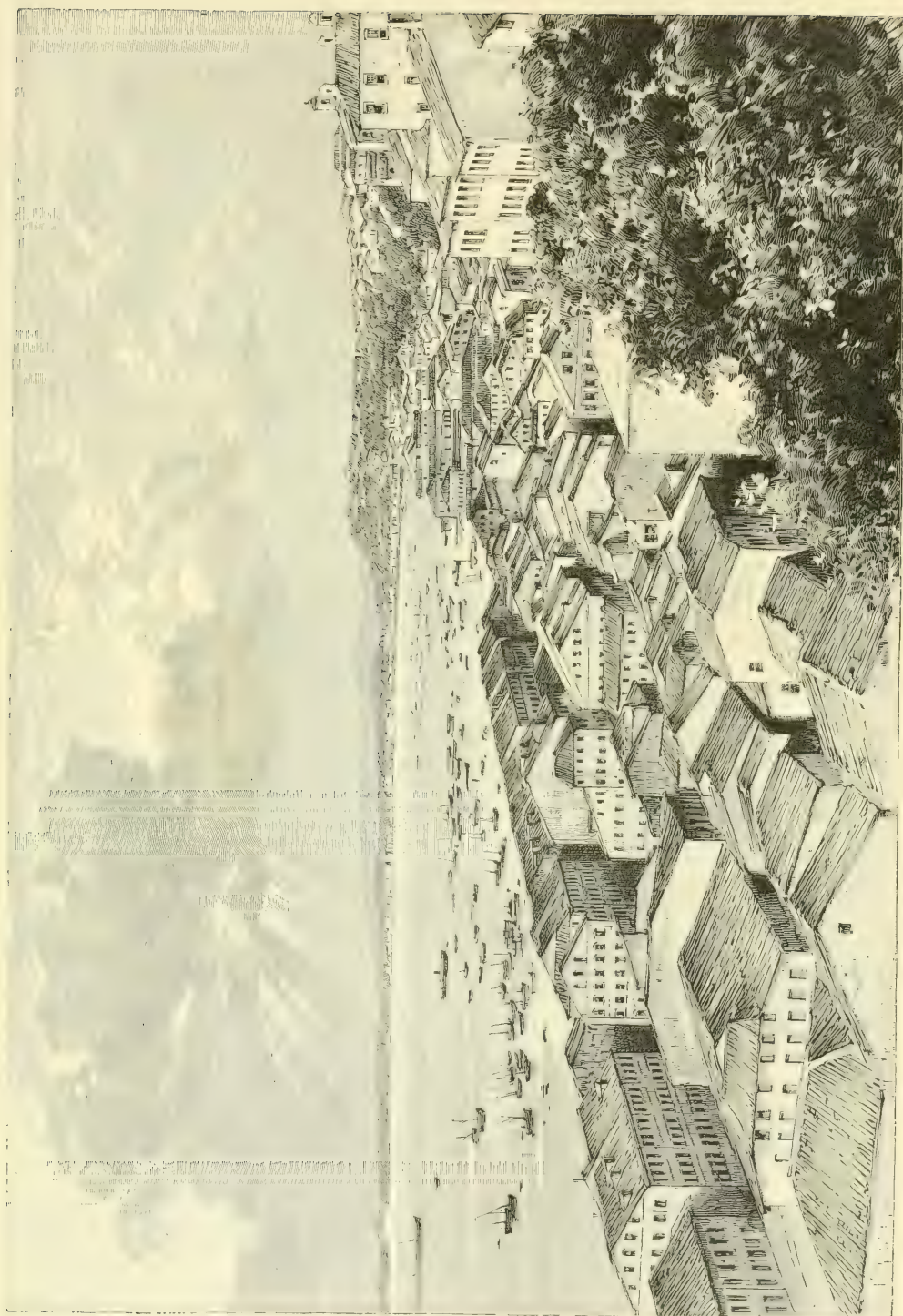
ABOUT half of this region is comprised within the S. Francisco basin, a vast depression of oval shape analogous to that of the twin rivers Araguaya and Tocantins, of nearly the same size. Only the S. Francisco does not maintain its normal direction from north to south, but trends round to the east, falling into the Atlantic at the point where the coast-line begins to turn south-west below the Pernambuco promontory. By this change in its course the main artery, rising in the zone of elevated plateaux, gives a certain unity to both of the natural regions which it traverses.

Farther south the crests of the divide form a sharp limit between the fluvial basin and the slopes facing the Atlantic. But viewed as a whole, the coastlands may be regarded simply as the seaward escarpments of the plateaux watered by the S. Francisco. But the political frontiers coincide only to a certain extent with their natural limits. In the south the State of Minas Geraes encroaches considerably on the Parana slope, as well as on the Rio Doce basin towards Espirito Santo or Rio de Janeiro.

But however limited in extent, the region of the S. Francisco combined with that of the Atlantic slopes is the most important section of the republic. Minas Geraes ("General Mines"), one of its four political divisions, is a magnificent country with natural resources rendering it independent of the whole world. Although not the largest, it is by far the most populous State in Brazil, and even from the historic point it may claim the first rank. After enriching Portugal beyond all the other colonies, it was the first to strike a blow for national independence, and such is its commanding position that proposals have several times been made to break it up into two or more separate States.

Bahia, although of less importance than Minas Geraes, takes the second place in the republic for population, and its capital is surpassed by Rio de Janeiro alone in size and commercial activity. Sergipe, despite the small extent of its territory, takes more than its share in the general trade of the country, and even Espirito

BAHIA—GENERAL VIEW OF THE BAY.



Santo, mainly a forest zone of difficult access, has made rapid progress in recent years. Collectively the four States comprise a superficial area of about 434,000 square miles, with a population (1893) of 5,570,000.

PROGRESS OF DISCOVERY AND SETTLEMENT.

The vast bay of Todos os Santos, on which now stands the city of Bahia, was already sighted by Christovão Jaques in 1503, three years after the discovery of the Brazilian coast. The colony developed rapidly in the second half of the sixteenth century, after Bahia had been chosen as capital of all the Brazilian captainries. But the forest-clad seaward slopes long presented an insurmountable barrier to the occupation of the interior. Expeditions were, however, undertaken towards the unknown lands traversed by the Upper S. Francisco, whence Marcos de Azevedo brought silver and emeralds in 1650. Twenty years later some daring Paulistas, under Fernando Dias Paes Leme, pushed northwards to the regions reported to abound in precious stones. They reached the sources of the Rio Doce without, however, discovering the treasures for which this district afterwards became famous.

Other Paulistas were more fortunate, and in 1720 the Portuguese Government, in order to secure its mineral revenues, constituted the captainry of Minas Geraes with about the same limits as those of the present State. Each of the new mining centres became starting-points for fresh explorations, and since the era of scientific research was opened by Humboldt, the whole land has been traversed by Von Eschwege, Auguste de Saint-Hilaire, Spix and Martius, Mawe, Gardener, Spruce, Burton, Liais, Halfeld, Wells, Manoel de Macedo, and others. In 1815-17 Max von Wied visited and carefully described the Botocudos; Lund devoted many years to the study of the extinct fauna of the Caves; Gorceix, Hartt, Fermand, Orville, Derby, and many other miners, engineers, and geologists examined the character of the rocks and their mineral treasures, and a beginning has been made with a topographic map to the scale of $\frac{1}{100,000}$, which is to be connected with works of a like nature now progressing in the State of S. Paulo.

PHYSICAL FEATURES.

To the mountainous region where the Rio S. Francisco takes its rise, the term *campos*, "plains," or "fields," is sometimes applied; but these upland plains present no such level spaces as the Venezuelan llanos. The surface is everywhere broken by hills rising from 300 to 600 feet above the normal height of the vast plateau. One of the loftiest summits in Minas even takes the name of Itabira do Campo, in contradistinction to the less elevated Itabira da Serra, or do Matto Dentro, in the mountainous and wooded eastern regions.

The mean altitude of these uplands, which form the central water-parting of Brazil, and which slope in all directions, is about 3,000 feet, while the culminating peaks between Queluz and Barbacena exceed 4,000 feet. From this central nucleus diverge the various ranges, which rise above the common pedestal, and which nearly everywhere decrease with it in altitude.

Towards the west the S. Francisco and Parana basins are separated by such a range, which farther on merges in a second divide, whence ramify northwards the Serra da Canastra and numerous other ridges. South-west of the Barbacena knot a chain with steep outer slopes is developed parallel with the Rio de Janeiro coast. North-eastwards the Serra da Mantiqueira, as this chain is called, is continued under various names, everywhere following the trend of the coastline. Lastly, in the north stretches the main range to which Eschwege has given the name of Serra do Espinhaço, that is, the "Backbone" of Brazil. Yet the peaks rising above this range are of moderate elevation, the very highest, the Caraça Peak in the north-east, falling, according to Liais, below 6,500 feet. Farther south follow the Piedade (5,850 feet), and near Ouro Preto, capital of Minas, Mount Itacolumi, which was long supposed to be the culminating point of Brazil, but to which Gerber assigns a height of not more than 5,600 feet. In geological terminology, Itacolumi has given its name to a yellowish sandstone which covers a great part of Central Brazil, but which, according to Burton, forms at most only a small part of Itacolumi itself. Like Caraça, this mountain is said to consist mainly of quartzite.

North of Caraça the Serra do Espinhaço is continued for a distance of about 150 miles, without presenting any very prominent summits. Beyond the Itabira da Serra follow, in the diamantiferous Serro do Frio, the igneous Itambé (4,315), and west of the Rio das Velhas, the rugged and twin-crested Itabira do Campo (5,150 feet). Like the other Itabira, this mountain consists almost exclusively of a ferruginous ore, the so-called "itabirite," containing 60 per cent. of pure metal. On various maps of this district there figures a so-called Mount Boas, 7,550 feet high. But no such name is known in the country, nor do any of the summits attain such an elevation above the sea.

Beyond the Diamantina ridge is developed the sinuous Itacambira range, which is continued northwards by the Grão Mogol chain, and farther on by the Serra das Almas. This section merges in the State of Bahia in vast plateaux, where the ranges are in reality mere scarps of the tablelands eroded at their base by the running waters. A more distinct chain is the Serra dos Aimores, which takes its name from its former aboriginal inhabitants, and which runs parallel with the coast of Espírito Santo, though pierced by the gorges of numerous rivers flowing from the eastern slopes of the Espinhaço. In the quartzose gneiss Capazão mass near the root of this chain, the botanist Schwacke has recently scaled a hitherto unknown summit 7,220 feet high.

West of the Rio S. Francisco, a few other ridges, such as the Serra dos Divisões between Minas and Goyas, still present a somewhat mountainous aspect. But farther north all traces of mountains disappear, and here nothing is seen except desert plateaux, formidable *travessias* destitute of water and vegetation, and in many places covered with salt. Lastly in the same Rio S. Francisco valley rise numerous groups and ridges, some parallel with the fluvial valley, others running athwart its course and giving rise to cascades and rapids.

Of these groups the most famous is that of Lagoa Santa, well known in the

geological and pre-historic records of Brazil. The limestone district is pierced by innumerable caves, some mere fissures, others vast galleries, huge vaulted chambers, winding passages, ramifying in an endless maze of underground recesses. The rocks seem to have been first crushed by tremendous lateral pressure, and then eroded by running waters. Calcareous concretions hang from the vaults of the caverns, or rise in pillars from the floor, which is covered with argillaceous layers of varying thickness containing land and fresh-water shells identical with contemporary species. In these layers have also been found enormous quantities of animal remains which have been studied by Claussen, and later more successfully by Lund.

East of the S. Francisco valley the "Backbone" consists mainly of gneiss, passing in certain places to granite, syenite, and mica-schist. The crystalline rocks are of a granulated texture, with large feldspar crystals easily disintegrated and forming arenaceous and reddish layers disposed in broad slopes at the base of the hills; in some districts these layers, covered with a vegetable humus, are nearly 1,000 feet thick. Nowhere are seen any sedimentary deposits overlying masses of gravel produced by the disintegration of mountains, which at one time stood at a prodigious elevation above sea level. "The conclusion is irresistible that ancient Brazil was one of the greatest mountain regions of the earth, and that its summits may very probably have exceeded in height any now existing in the world. What we now behold are the ruins of the ancient mountains, and the singular conical peaks are, as Liai has explained, the remains of some harder masses of metamorphic gneiss, of which the strata were tilted at a high angle." *

The plateaux in which the Parana and its affluents have excavated their upper valleys are formed to a considerable, but still undetermined, depth of the triturated fragments of the ancient Brazilian highlands; such is also the origin of the plains of Paraguay Gran Chaco, and the Argentine pampas, as well as of the sandbanks in the Plata estuary. In this chemical laboratory the rocks have changed their place and form—from crystalline mountains they have become stratified plains.

Here also the ground contains much gold, as well as iron ores, and, in some districts, diamonds. Those mines more especially are worked which are covered with *canga*, a recent conglomerate formed by the detritus of the mountains, and cemented by ferruginous waters. The gravels under which diamonds are found are known by the name of *cascalho*.

RIVERS—THE S. FRANCISCO.

The Rio S. Francisco, explored by Halfeld in 1852-54, and by Liai in 1862, was known in its higher reaches to the Paulistas before its lower course had been traced or identified with the estuary discovered and named the S. Francisco in the year 1501.

After flowing for about half its course from south to north parallel with the Tocantins, Xingu, and other Amazons affluents, it trends round to the north-east

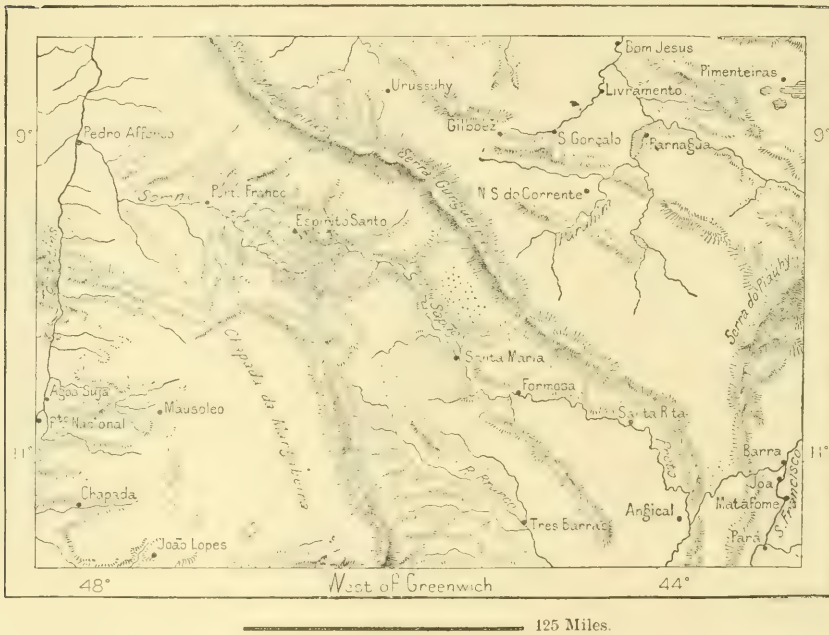
* John Ball, *Notes of a Naturalist in South America*, p. 317.

and then to the east, and before reaching the ocean even turns to the south-east, after descending from the inland plateaux over the superb Paulo Affonso Falls.

Even near its source in the Serra da Canastra, the S. Francisco develops a cascade to which Saint-Hilaire, confounding it with another, has wrongly given the name of Casca d'Anta. Descending to the lower valley through a succession of *escadinhas* or "steps," it is joined on the right by the Para, and farther on by the much more copious Paraopeba, which collects the surface waters in the south-eastern part of the basin. At this confluence the united streams have already a discharge of over 7,000 cubic feet per second, while the level is raised during the floods to from 26 to 40 feet according to the seasons. Thus are formed numerous swampy

Fig. 59.—SAPÃO AND SOMNO WATERSHED.

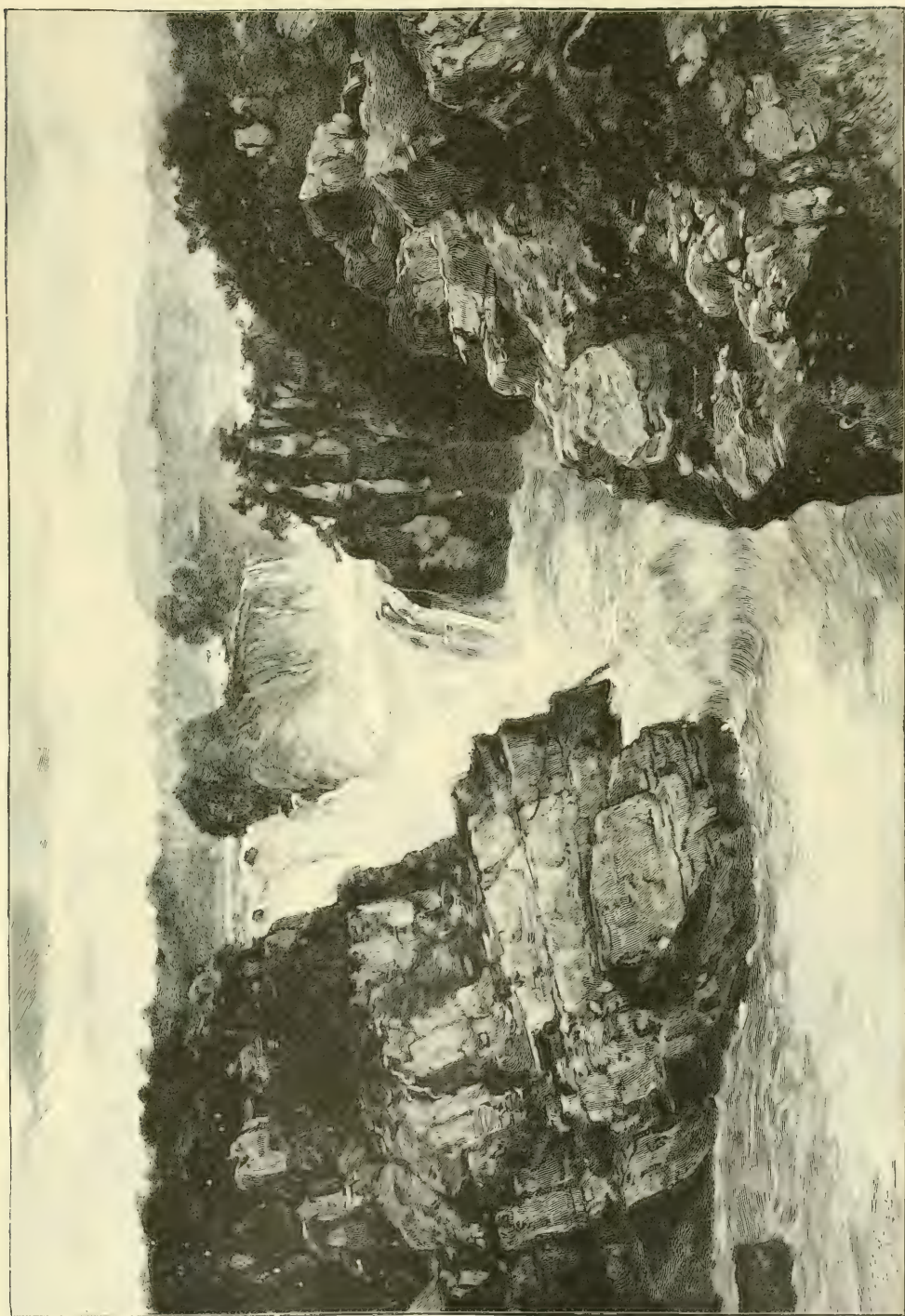
Scale 1 : 5,300,000.



and malarious tracts, whose noxious exhalations even affect swine after the inundations.

The Rio das Velhas (Guaicuby), chief affluent of the Upper S. Francisco, descends from the Queluz heights in the mining district, and contributes on an average over 7,000 cubic feet per second to the main stream. The Velhas is partly fed by underground streams carrying off the overflow of the numerous reservoirs in the cave district. The Lagoa de Sumidouro, one of the subterranean lakes, is alternately flooded and empty according to the rainy and dry seasons.

Below the Velhas confluence, the S. Francisco flows in a broad, deep channel, navigable by large craft throughout the year. Here it is joined by several copious affluents, also navigable in their lower courses—the Paracatu ("White River"), the Urucuia, and the Carinhanha from the west, and from the east



PAULO AFONSO FALLS.

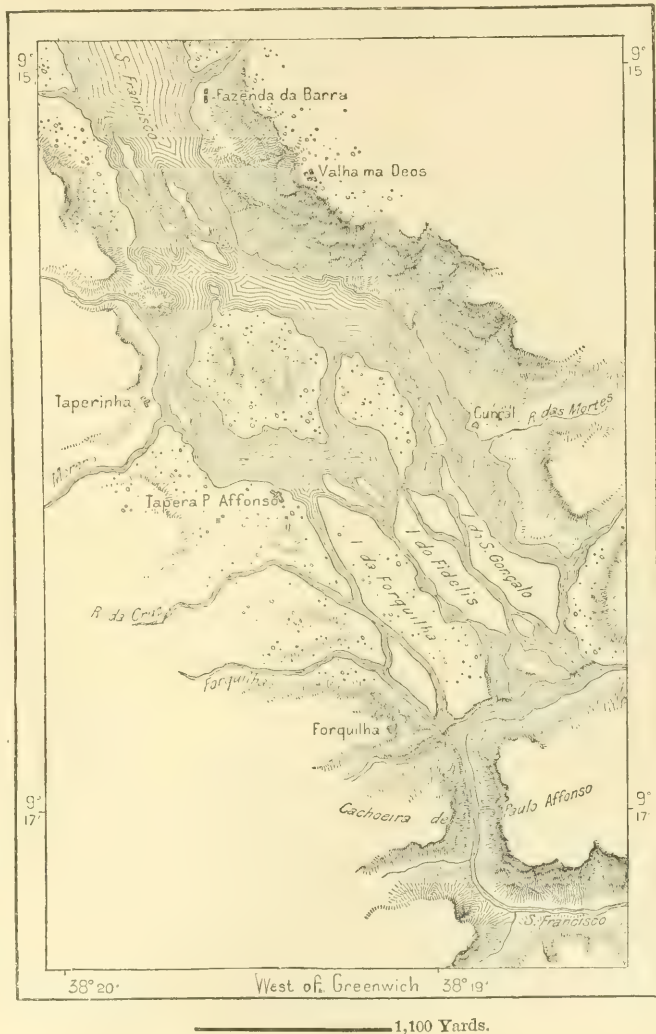
the Rio Verde. But the largest affluent is the Rio Grande, which joins the main stream at the point where it begins to bend round to the north-east. Through its Rio Preto tributary, its Sapão sub-tributary, a lake with double discharge, and the Rio Somno, the Rio Grande offers a continuous waterway from the S. Francisco to the Tocantins, and consequently to the Amazons. The engineer Moraes has proposed to construct a canal to divert the Rio Preto into one of the upper affluents of the Parnahyba, and thus contribute to relieve the distress of the inhabitants of Ceara during periods of long drought.

Below the Rio Grande the S. Francisco has still to descend 1,300 feet before reaching the sea. Where it begins to be deflected abruptly eastwards, its level is lowered through a series of dangerous steps, forming the upper stages of the great Paulo Affonso Falls, justly regarded as the "wonder of Brazil." Above the falls the stream whirls along amid a labyrinth of islands, reefs, and isolated rocks, so close together that at low water a plucky jumper might leap from stepping stone to stepping stone right across the current, although even then it discharges over 35,000 cubic feet per second. During the floods its volume is increased probably fivefold, for at this point the S. Francisco, already within 60 miles of the sea, has received all its great affluents.

As it draws near the falls the stream ramifies into several channels between three elongated islands and some neighbouring islets, all formed of a compact mass of gneiss. At the lower extremity of the group, the channels, which varying

Fig. 60.—PAULO AFFONSO FALLS.

Scale 1 : 37.000.



number with the seasons, reach the head of the plateau, over which they plunge into a yawning chasm 280 feet below. At high water the plunge is made at a single drop; but at other times the water first strikes a ledge projecting about 30 feet from the side; then, after a second drop of 50 feet, it reaches the chasm at a third leap. But what is thus lost in majesty is gained in the element of the unforeseen, and in the bewildering effect produced by several columns of water clashing, rebounding in parabolic curves, radiating volumes of iridescent spray into space.

The main body of water, representing nearly the whole river, although scarcely more than 50 feet broad, escapes through the channel lying nearest to the right bank. The rest of the stream from the upper cataracts rejoins the swirling flood through a narrow bed skirting the base of the enclosing wall. Then the united current rushes into a formidable *garganta* (gorge) with vertical sides excavated in the live rock, with overhanging ledges, possibly the remains of natural bridges formerly crossing the gorge at spans of from 260 to 330 feet.

To view the cataract in its wildest mood, visitors usually take their stand in a grotto which has been gradually formed by the action of the rising spray. No other falls present a more surprising diversity of aspects according to the varying condition of the river. Comparisons are naturally made between the North American and this "Brazilian Niagara," and although there is almost a total lack of the umbrageous vegetation one expects to see in this tropical zone, there is also at least so far a complete absence of the unsightly factories by which the northern falls are disfigured.

Beyond the gorges the S. Francisco continues to descend through a succession of cascades and rapids inaccessible to river craft all the way to Piranhas, where the river flows at a height of not more than 60 feet above sea level. Here it broadens out in the direction of the south-west, entering the sea through two mouths between shady banks of anacardiums, mangoes, and coconut palms. At low water the bar is less than 10 feet deep, and the approach is often endangered by the rocky shallows and breakers one or two miles off the estuary. The Paulo Affonso falls and gorges are turned on the north bank by a railway connecting the navigable waterways above and below these obstructions.*

COAST STREAMS.

South of the Rio S. Francisco follow several coast streams rising on the eastern slopes of the Serra dos Aimores or of its offshoots, and consequently greatly inferior in length and drainage area to the main artery. The Paraguassu with its Jaquipe (Jacuhype) affluent falls into a lateral inlet of Todos os Santos Bay; but at the head of the tidal waters its navigation is arrested by a cascade.

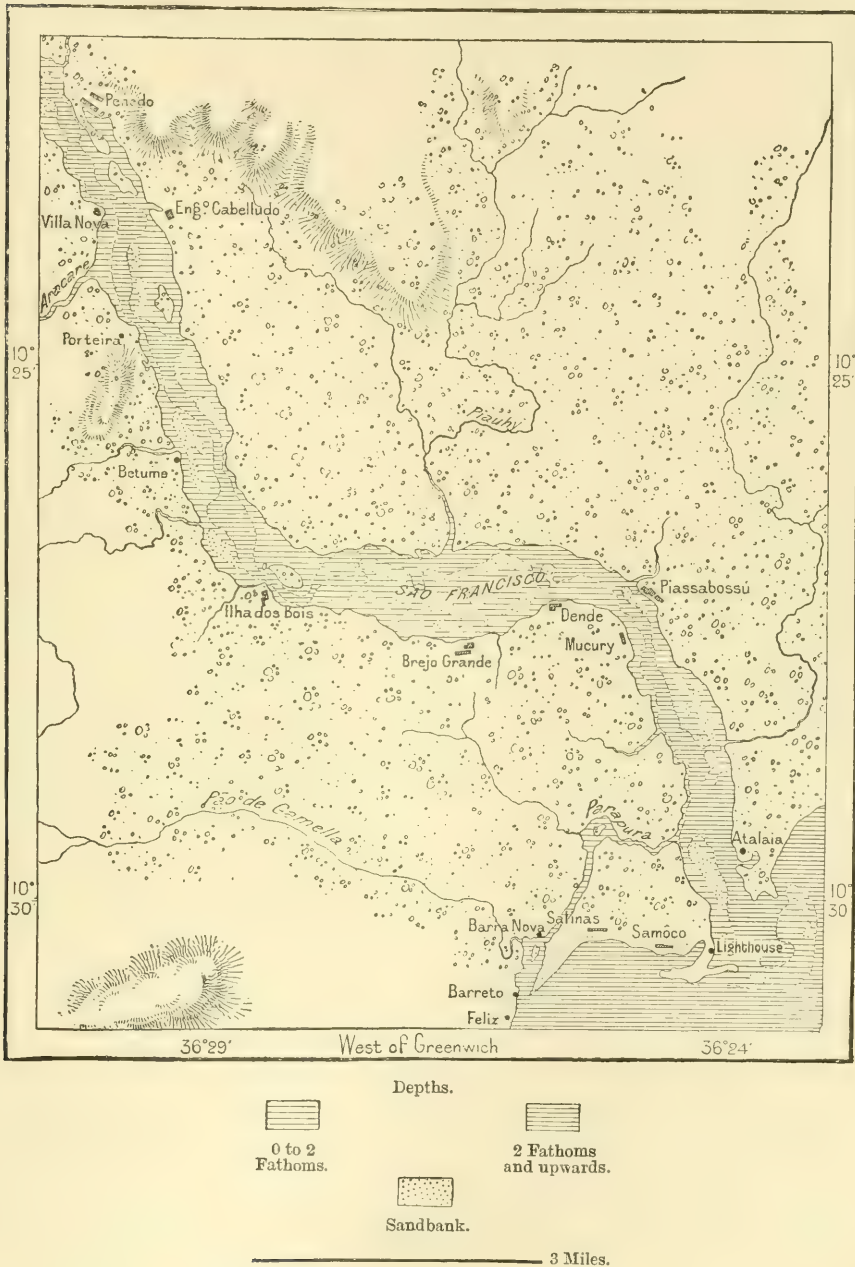
* Hydrography of the Rio S. Francisco:—

Total length of mainstream	1,800 miles.
Area of basin according to Chichko	267,000 square miles.
Navigable upper course	810 miles.
Navigable lower course	135 miles.
Navigable waterways of the whole basin	4,350 miles.
Discharge per second according to Liais	99,000 cubic feet.

The Rio de Contas is similarly obstructed by numerous falls. Farther south the Pardo and Poxim have a common delta with the Jequitinhonha, which often takes

Fig. 61.—MOUTH OF THE S. FRANCISCO.

Scale 1 : 130,000.



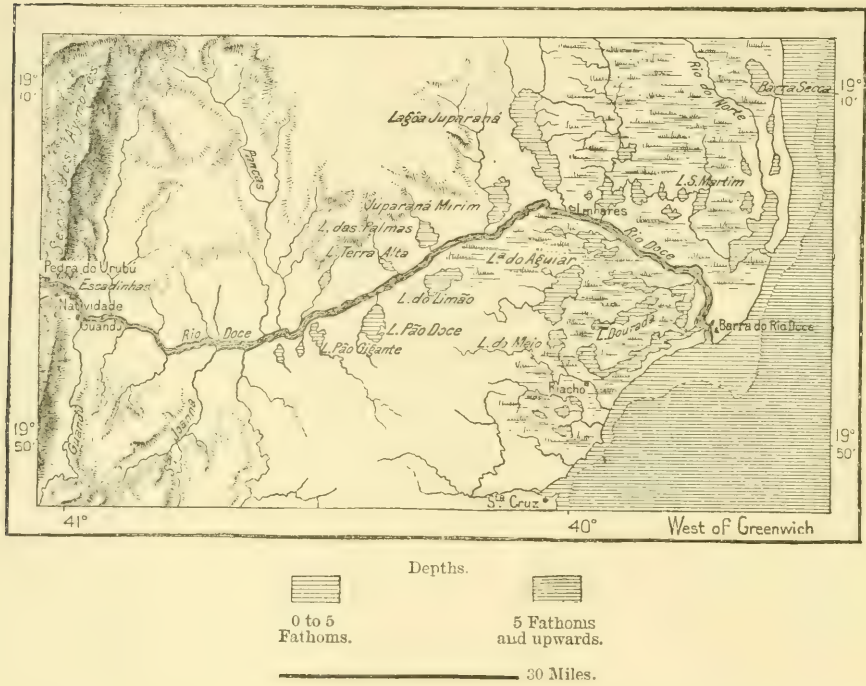
the name of "Little S. Francisco," from its great volume and the grand cataracts interrupting its lower course. Below the Salto Grande ("Great Falls"), the Jequitinhonha, which sometimes takes the name of Rio Belmonte from the town

at its mouth, becomes a navigable stream; but its mouth is blocked by an extremely dangerous bar with only six or seven feet of water at flow.

A more natural highway to the mining districts of the interior is presented by the valley of the Rio Doce, which receives its farthest headwaters from the eastern slopes of the Espinhaço Range. But the dense forests, rugged mountains, fluvial gorges and cataracts, and till recently the neighbouring independent Indian tribes, have hitherto prevented this route from being utilised. The river scarcely deserves its title of *Doce*, or "Mild," until it has escaped from the State of Minas Geraes, through a series of terraced falls and rapids. On the low-lying plains, where it becomes navigable, both banks are lined with lakes and swamps, which

Fig. 62.—LOWER COURSE OF THE RIO DOCE.

Scale 1 : 1,600,000.



receive the overflow of the flood waters. At this period its level is higher than that of the surrounding plains, which have scarcely yet been reclaimed from the ocean. The Rio do Norte, one of the lateral creeks in this half-submerged region, flows parallel with the coast for over 70 miles northwards in the direction of the Rio Mucury. The bar of the Rio Doce has at least 10 feet at ebb, and over 14 at high water.*

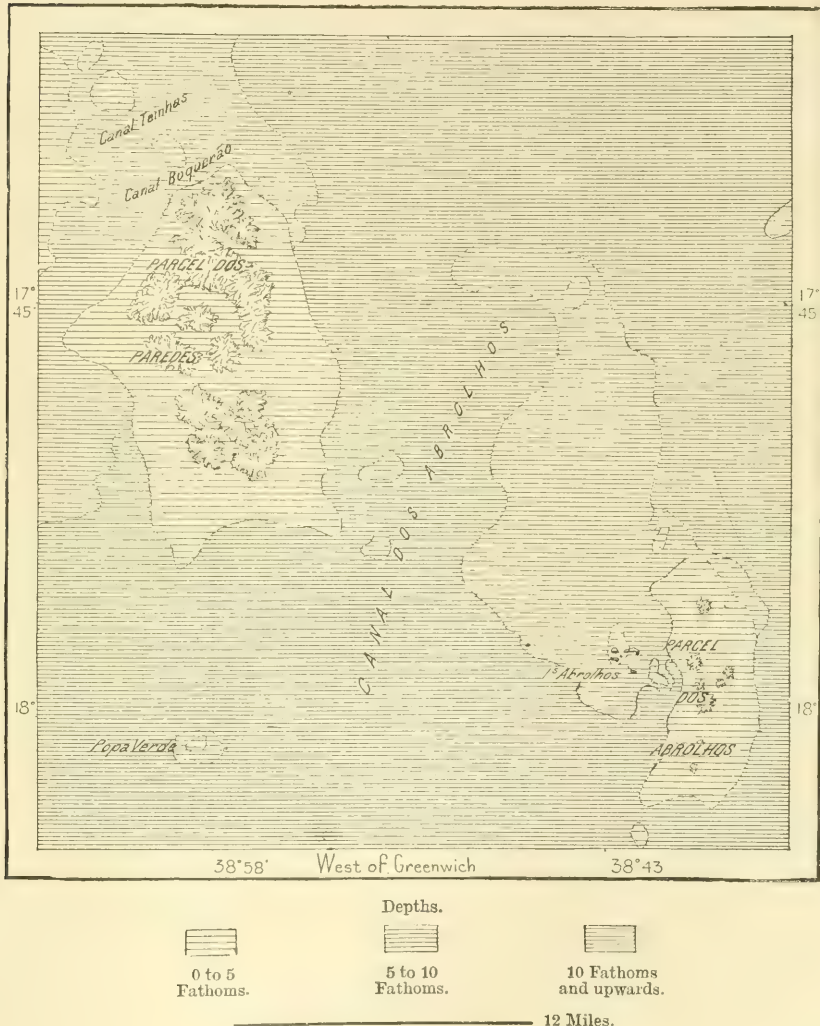
* Chief coaststreams between the Rio S. Francisco and the Parnahyba, according to Chichko :—

	Length in English miles.	Drainage Area in square miles.
Itapicuru	320	15,000
Paraguassu	300	18,000
Contas.	310	22,000
Jequitinhonha with the Pardo	500	42,000
Doce	435	37,000

Between the Jequitinhonha and the Mucury, the coast is fringed at varying distances by a few clusters of coralline reefs, such as the Itacolumi, and the remarkable atoll encircling the Abrolhos, three granitic islets about 130 feet high. Near the Abrolhos is the dangerous Parcel atoll, scene of many a shipwreck. In these waters, some 40 square miles in extent, the coral reefs spring from the

Fig. 63.—ABROLHOS.

Scale 1 : 500,000.



marine bed in columnar form, sometimes spreading out at top like "parasoles." These *chapeirões*, or "large hats," as they are called, stand flush with the surface in depths of from 5 to 10 fathoms. They consist of innumerable many-coloured branches, of such delicate texture that they are often crushed, and their shafts even overturned by passing vessels, which continue their course uninjured by the collision.

Some 600 miles seawards stands the volcanic Trinidade Island, which the astronomer Halley occupied in 1700, in the name of England. But since the close of the eighteenth century it has belonged politically to Brazil. About 30 miles farther east are seen the three islets of Martim Vaz, so named from the Portuguese pilot who discovered them at the beginning of the sixteenth century.

CLIMATE.

On the coastlands the temperature in this tropical part of Brazil never falls below 68° F., ranging from about 72° in July to 79° or 80° in January. Towards the interior the heat naturally decreases with the altitude, while the range between the extremes increases from about 18° on the seaboard to as much as 54° on the plateaux.

Between Recife and Rio de Janeiro, the coast lies entirely within the zone of the southern trade winds, which set steadily from the south-east during the winter season from April to September. In summer the north-east trades predominate; but irregularities occur in all seasons, and the calms resulting from the collision between opposing currents are sometimes followed by fierce storms, though true cyclones are rare.

Although the European settlers speak officially of "spring, summer, autumn, and winter," the only natural division is that of the Guarani natives, who recognise the "season of the sun" and the "season of rain" alone. On the coast the rains, which fall chiefly in autumn, are much heavier than on the plateaux, sheltered by the mountains from the moist sea breezes. Nevertheless, even in the Upper S. Francisco basin the precipitation is abundant enough to develop boggy tracts like those of Ireland. Farther north the elevated *chapadas* of Bahia suffer, on the contrary, from a deficient rainfall, and here some districts present the aspect of real deserts.*

FLORA AND FAUNA.

A selva comparable to that of Amazonia occupies all the well-watered coastlands and the higher valleys of the ranges exposed to the moist marine winds. But on the western slopes of the backbone continuous woodlands become rare. Much of the treeless aspect of the hills is, however, due to the action of man, especially in the mining districts, where the timber required for the underground galleries has often to be renewed every four years. On the northern plateaux the forests are reduced to mere catangas, clumps or thickets of shrubs which shed their leaves during the dry season; here many of the heights, especi-

* Meteorological conditions of the Upper S. Francisco valley and of the towns on the adjacent seaboard:—

	Latitude.	Height.	Temperature.			Rainfall.
			max.	mean.	min.	
Conconhas de Sabara	$19^{\circ} 47'$	2,250 feet	90° Fahr.	68° Fahr.	34° Fahr.	66 inches
Bahia	$12^{\circ} 58'$	215 „	88° Fahr.	79° Fahr.	70° Fahr.	96 „

ally in the southern parts of Bahia, are entirely destitute of vegetation and covered with saline efflorescences.

In their general features the flora and fauna differ in no respects from those of the neighbouring provinces. But some of the species are confined to limited areas, and many of the fishes of the Upper S. Francisco are quite different from those of the lower reaches below the falls. Minas Geraes and Bahia, like Ceara and Piahy, had a far richer fauna characterised by huge quadrupeds in a relatively recent epoch than at present. In the neighbourhood of Lagoa Santa, Lund and other naturalists have discovered in about 1,000 caves as many as 115 species of fossil mammals, whereas the living fauna no longer comprises more than 88 altogether. Amongst the extinct animals, Lund describes a great ape, an enormous jaguar twice the size of the present Brazilian "tiger," a cabiai as big as a tapir, a horse greatly resembling our modern horse, and a llama like that of Peru.

INHABITANTS.

Human remains also are found in the caves of Minas Geraes, where Lund has discovered the fossil bones of at least thirty persons of all ages. From his comparative study of these remains he infers that the race to which they belonged was identical in its general type with that by which it was occupied at the time of the discovery. The most striking feature of the Lagoa Santa skulls is the narrowness of the receding forehead, like that of the figures carved by the Mayas on the Palenque monuments. The cheek-bones also are very prominent, while the incisors have a broad flat surface like that of the molars. To judge from their small brain-pan, the natives of the Upper S. Francisco basin must have possessed a low degree of intelligence. The *coriscos*, or stone axes, often picked up in the country, exactly resemble those of European collections in form and substance.

The natives of the coastlands, with whom the discoverers first came into friendly or hostile contact, belonged to the Ges family. The Tupi, most civilised of all the aborigines, applied to these coastlanders the depreciative term Tapuya, "Strangers" or "Barbarians." This is the same word that, under the slightly modified form of Tapuyo, is now applied collectively to all the Indians living at peace with the Brazilians.

Of the Ges family the best known representatives are the famous Burungs, better known as Botocudos, from the *botoque* or wooden disc worn by them in the under lip and in the ear-lobes. They also take the name of Aimores, which has been extended to the mountains dominating their territory. Some ethnologists class the Botocudos in a separate family.*

The nomad survivors of the ancient Aimores have their camping-grounds on the banks of the Mucury, Doce, and other coast streams and in the forests of the Atlantic slope of Minas Geraes. About 1830 they still numbered some 14,000;

* A. H. Keane, *On the Botocudos*, 1883, p. 5.

but since then most of the tribal groups have disappeared, partly through epidemics and general absorption in the surrounding settled populations, but partly also through wholesale butcheries encouraged by the Brazilian officials. During the early frontier wars, from about 1790 to 1820, every effort was made, not merely to reduce, but to extirpate them root and branch. Being regarded as irreclaimable savages, addicted to cannibalism and other pagan practices, and altogether no better than wild beasts, methods of warfare were adopted against them which are not usually sanctioned by civilised communities. The small-pox virus was industriously spread amongst them, and poisoned food scattered over the forests frequented by their hunters. By these and other means the Conde de Linhares cleared the coast districts about the Rios Doce and Belmonte, and another Commendador boasted to Professor Hartt that he had either slain with his own hand, or ordered to be butchered with knife, gun, and poison, many hundreds of this "vermin."

The charge of cannibalism brought against the Botocudos by early writers, and still imputed to them by their neighbours, seems to be fully justified by abundant evidence. D'Orbigny states that they wore collars or strings of the teeth of the persons they had eaten, and the portrait of a woman so ornamented is figured in Sir W. Ouseley's "Travels." Von Martius also asserts positively that all were formerly anthropophagists, devouring not only the enemy slain in battle, but also members of the Puri, Malali, Coroado, and other kindred tribes. The heads were not eaten, but stuck as trophies on stakes, and used as butts for the practice of archery.

All the *bravos*, that is, the independent wild tribes, are still in the stone age, or rather, have scarcely yet reached that stage. The highly-finished diorite, granite, and porphyry implements, found in the surrounding districts, belong to the Amazonian and other more advanced Brazilian aborigines, and do not appear to have ever been used by the Botocudos. The objects manufactured by them are almost exclusively of wood or vegetable fibre. Such are the wooden mortars, bamboo water vessels, cotton or bark sacks, reed spears, bows and arrows, which last are their only offensive weapons. The bow is about 6 feet long, and so strong that none but natives can use it; the arrows also are of great length, and, being poisoned, the Portuguese soldiers had to be protected against them by the *giboa d'armas*, a kind of armour, made of cotton cloth, thickened with several layers of cotton wadding.

An instrument of a more peaceful character is a small bamboo flute, which is played on through the nose. This strange habit was probably occasioned by the lip ornament, which prevented the mouth from being conveniently used for the purpose.

Physically, the Botocudos are of robust frame, with full chest, broad shoulders, small extremities, somewhat oblique eyes, prominent cheek-bones, very large mouth and skull like that observed by Lund in the Lagoa Santa skeletons. Their distinctive ornaments were the enormous discs of light wood by which the lower lip and ear-lobes were immensely distended. Unable to use the lips in speaking,

they spoke from the throat and through the nose, and were unable to utter several consonantal sounds. Their arms were barbed darts and arrows, their habitations frail structures of foliage, their religion fear of evil spirits, against whom they protected themselves by kindling great fires, as against wild beasts. At present the few surviving Botocudos all speak Portuguese, and since 1870 the use of the botoque has fallen into abeyance.

Another extinct tribe of different speech and origin were the Malali, visited in 1817 by Saint-Hilaire, but since merged in the surrounding peasant population.

Fig. 64.—ANCIENT INDIAN POPULATIONS OF EAST BRAZIL.

Scale 1 : 11,000,000.



They went in great dread of the Botocudos, and one of their choice articles of food was a large white worm, which had the property of throwing into an ecstatic sleep of several days those who ate it.

Unless the legend of Ramalho and his adventures in the Bay of Santos have a substratum of truth, the first white settlers in Brazil were the interpreters left by Alvarez Cabral on the Santa Cruz coast, and the pioneers who lived with the aborigines on the shores of Todos os Santos Bay. The settlement on this bay acquired considerable importance, first as the capital, and, later, as the second

city in Brazil. But the spot where Cabral's associates landed is at present one of the least frequented in the whole country.

The first arrivals from Portugal generally penetrated inland to the plateaux of Minas Geraes and the Upper S. Francisco Valley, attracted, in the first instance, by the mineral wealth of these regions, and afterwards induced to remain by the fertility of the land, its excellent climate, and abundant resources. Towards the second half of the seventeenth century the intrepid Paulistas flocked in thousands to the mining districts in quest of gold and of the precious stones wrongly called "emeralds." But they were not the only intruders, and the settlers on the shores of Rio de Janeiro, as well as adventurers from beyond the seas, also claimed a share in these treasures. Civil war soon broke out between these *emboabas*, or "strangers" from Portugal and the other provinces, and the Paulistas, who considered themselves the lawful owners of the mineral districts, which they had wrested from the Cataguar Indians. In 1708 the *emboabas* were nearly exterminated on the banks of the Rio das Mortes; but other bands pressed forward, and after renewed conflicts both factions had to become reconciled under the stern repressive measures imposed on all parties by the central government.

Extremely rigorous laws were enacted to regulate the operations in the gold-fields, and afterwards in the diamantiferous districts discovered in 1728. Nowhere else was a more draconic administration introduced, and the consequence was widespread corruption, frauds, thefts, smuggling, and the general demoralisation which is the usual outcome of legalised terrorism.

Since that epoch the political relations have changed, and the mines, which had inspired this ferocious legislation, and caused all this moral degradation, are themselves now to a large extent exhausted. The old mining cities have fallen into decay; little remains of formerly flourishing centres of population, except crumbling ruins overshadowed by sumptuous churches like the vast minsters of mediæval Europe. But the impoverishment of certain districts has not prevented general progress, shown by a tenfold increase in the population since the mining days.

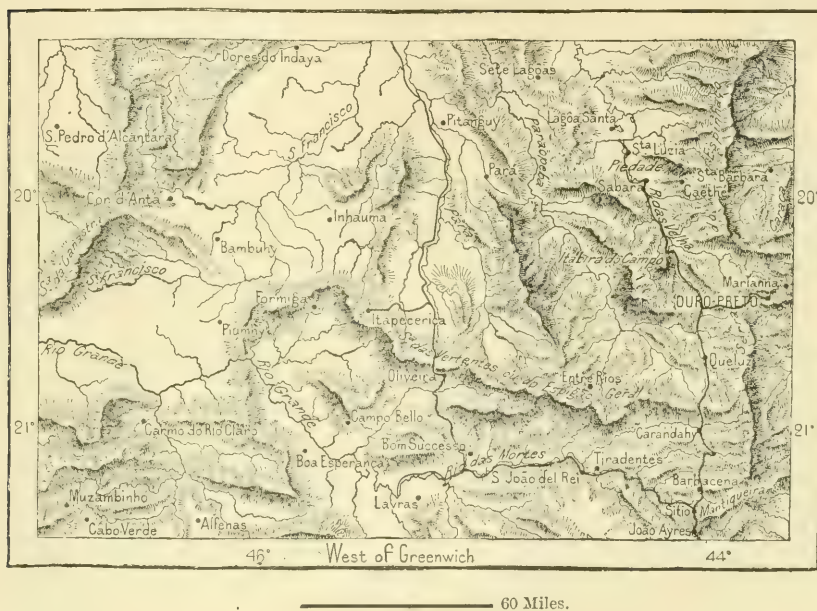
The blacks introduced as slaves in the mining districts of the plateaux have left scarcely any descendants, and the few survivors have been absorbed in the half-caste populations of the interior. But nowhere in Brazil are the Africans better represented than in the districts of the Lower S. Francisco and in the city of Bahia. Here was formerly the centre of the slave trade. Besides those introduced from the coast of Angola to work on the plantations and in the mines, others arrived as freemen in the quality of sailors and supercargoes, and to these (Krumen and others) was given the general name of Minas, from a tribe on the Slave Coast south of Dahomey. Even still these form in Bahia a sort of corporation, whose members are distinguished by their moral qualities and spirit of solidarity, as well as for their tall stature and physical strength. Their speech comprises numerous words inherited from the African languages, and hundreds of Yoruba and Cabinda terms have been adopted in the current dialect of Bahia. Here the negroes accompany their magic incantations with snatches of songs

from the old African tongues, and some of their families have lateral branches in Dahomey, with whom friendly relations are still maintained.

The Mineiros, or Geralistas, as the inhabitants of Minas Geraes are called, descend partly from pure or mixed Paulistas, partly from Portuguese immigrants. Besides these, all the nations of West Europe are represented in Bahia and the other coast towns. But systematic immigration dates only from the middle of the nineteenth century. The first attempts to settle the Mucury and Doce valleys with thousands of German, Dutch, Swiss, and Alsatian colonists ended in disaster. No preparations had been made to receive the strangers, most of whom perished of

Fig. 65.—QUELUZ KNOT AND UPPER S. FRANCISCO BASIN.

Scale 1 : 4,000,000.



typhus or famine, and the Mucury stations were long known by the name of *Carnificina*, the "Shambles."

Since then immigration has been carried on more successfully, and numerous settlements, chiefly of Italians, who are better suited for the climate, have been founded along the routes leading from the coast to the uplands. Thanks to them, the hitherto neglected State of Espírito Santo is being rapidly peopled.

TOPOGRAPHY—TOWNS OF MINAS GERAES.

Queluz, the town in the Upper S. Francisco basin which lies nearest to Rio de Janeiro, stands some 3,000 feet above the sea near the sources of the Paraopeba. Since its foundation in the middle of the eighteenth century, Queluz has passed through the same vicissitudes as the other settlements of the district. First en-

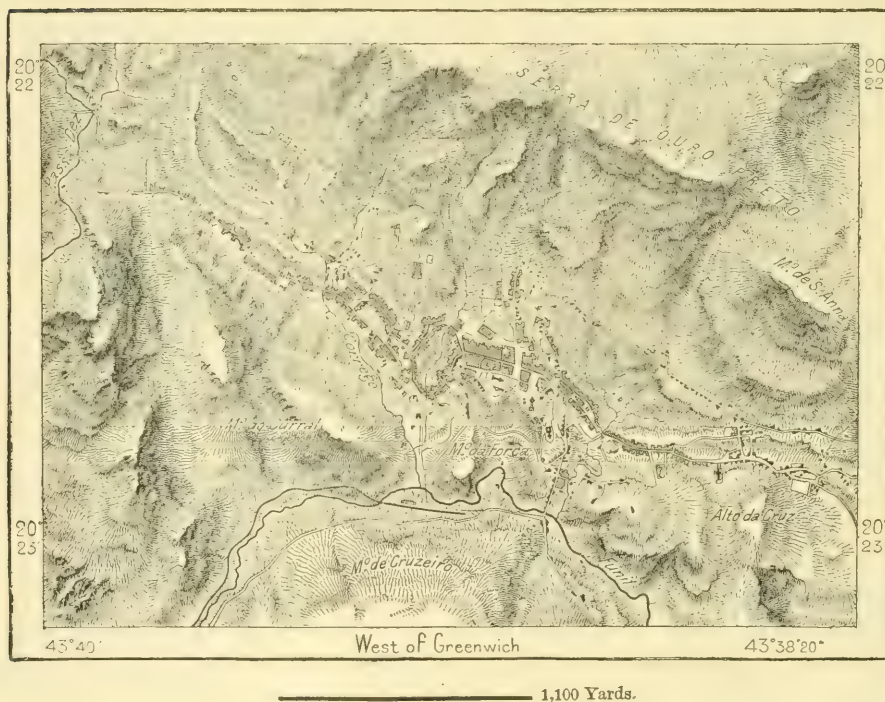
riched, then ruined by the decay of the mining industry, it has again prospered by agriculture and stock-breeding. The cotton grown in this district, as well as in those of *Bonfim*, *Tamandua*, and *Pitangui*, which lie more to the west in the Paraopeba and S. Francisco valleys, is used in the manufacture of highly valued fabrics preferred to similar stuffs of European make. The village of *Congonhas de Campo*, so named from a wild shrub resembling the Paraguayan *Yerba maté*, is one of the chief places of pilgrimage in Brazil.

OURO PRETO.

Miguel Burnier occupies a central position in the mining district of Minas Geraes. Westwards rises the Serra do Ouro, "Gold Mountain," and towards the

Fig. 66.—OURO PRETO.

Scale 1 : 30,000.

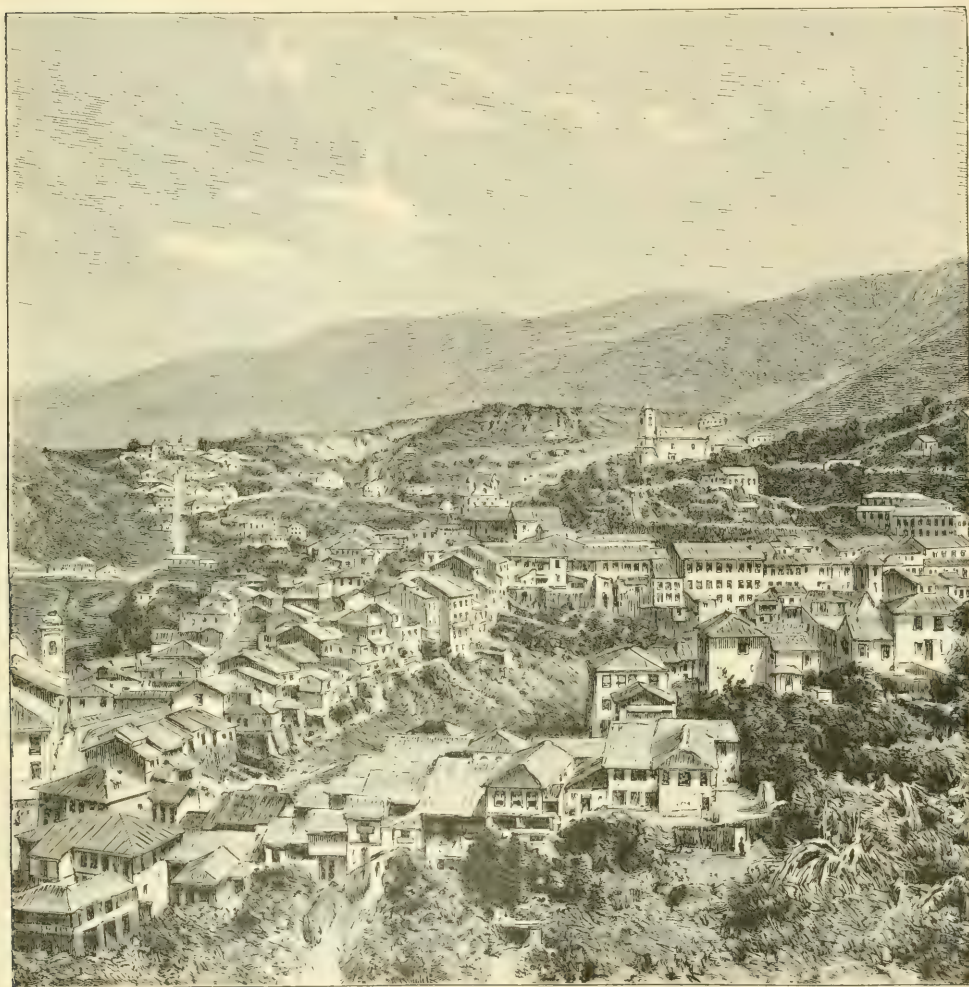


north-west another chain bears the expressive name of Serra da Moeda, "Money Mountain." *Ouro Branco*, "White Gold," occupies in the east an upland valley midway from *Ouro Preto*, "Black Gold," formerly *Villa Rica*, present capital of the State dominated on the south-east by the picturesque twin-peaked Itacolumi. Although lying in the Rio Doce basin, Ouro Preto belongs in its history, industrial and commercial relations entirely to the region draining to the Upper S. Francisco. Owing its existence to the auriferous deposits discovered in 1698, it stands on ground everywhere undermined by old galleries, in which is collected

the very water used for drinking purposes by its inhabitants. The streets themselves are mere trenches constructed in connection with the mining operations, and in 1875 ores were still extracted from a pit in the suburbs.

Despite the branch railway connecting Ouro Preto with Rio de Janeiro over a pass in the Espinhaço range, it suffers from lack of easy communications. Its

Fig. 67.—OURO PRETO—GENERAL VIEW.



school of mines, a scattered group of structures which is to be replaced by a monumental edifice, contains a marvellous collection of ores, diamonds, and crystals.

DIAMANTINA—LAGOA SANTA.

East of Ouro Preto, and at the foot of the same Mount Itacolumi, are situated the gold mines of *Passagem* and the decayed city of *Marianna*. The railway

traversing the eastern slope of the Espinhaço range here penetrates to the northern mining region through *Inficionado*, *Cattas Altas*, *Santa Barbara*, *Itabira do Matto Dentro*, *Conceição*, and *Serro*, all of which places occupy upland valleys watered by the headstreams of the Rio Doce. *Serro* still possesses some gold and diamond mines, but it now depends chiefly on its agricultural resources.

Diamantina, formerly *Tijuco*, lies in the upper Jequitinhonha valley, but its commercial relations are chiefly with Rio de Janeiro through the S. Francisco basin. The yield of its diamond mines has fallen from about £150,000 to less than £40,000 a year. Farther north the formerly flourishing town of *Grão Mogol* has been nearly abandoned.

In the Upper Rio das Velhas valley are several thriving places, such as *Sabara* at the head of the navigation, whose highly productive gold mines, especially *Morro Velho*, near *Villa Nova de Lima*, are now worked by some wealthy English companies. *Villa Nova* is well known to mineralogists by its old name of *Congonhas de Sabara*. *Morro Velho* employs from 1,500 to 2,000 hands, and at present has an average annual yield of about £80,000; if fully worked the output might exceed £280,000.

About eight miles from the railway west of *Sabara* lies the healthy plateau of *Bello Horizonte*, one of the sites which have been proposed for the future capital of Minas Geraes. The pure waters of the district already surveyed would suffice for the requirements of a city of 450,000 inhabitants. A narrow valley on the opposite side of *Sabara* is occupied by the mining village of *Caethé*, which abounds in asbestos.

Santa Luzia, below *Sabara* on the Rio des Velhas, lies near *Lagoa Santa*, where Lund passed many years exploring the surrounding caves. The jasper beds in the neighbourhood supply the material for the statuettes and other objects executed by the local artists. Farther on, *Parauna*, "Black Water," on the affluent of like name, has also been mentioned as a favourable site for the future capital of the State, of which it occupies the geometrical centre.

In the northern section of Minas Geraes the towns of *Montes Claros das Formigas* at the head of the Rio Verde, and *Paracatu*, formerly *Piracatu*, near the Goyaz frontier, have become flourishing centres of the cattle trade. Like those of *Lagoa Santa*, the *Montes Claros* cliffs are pierced by numerous caves, in which have been found the remains of the megalonyx and other extinct animals.

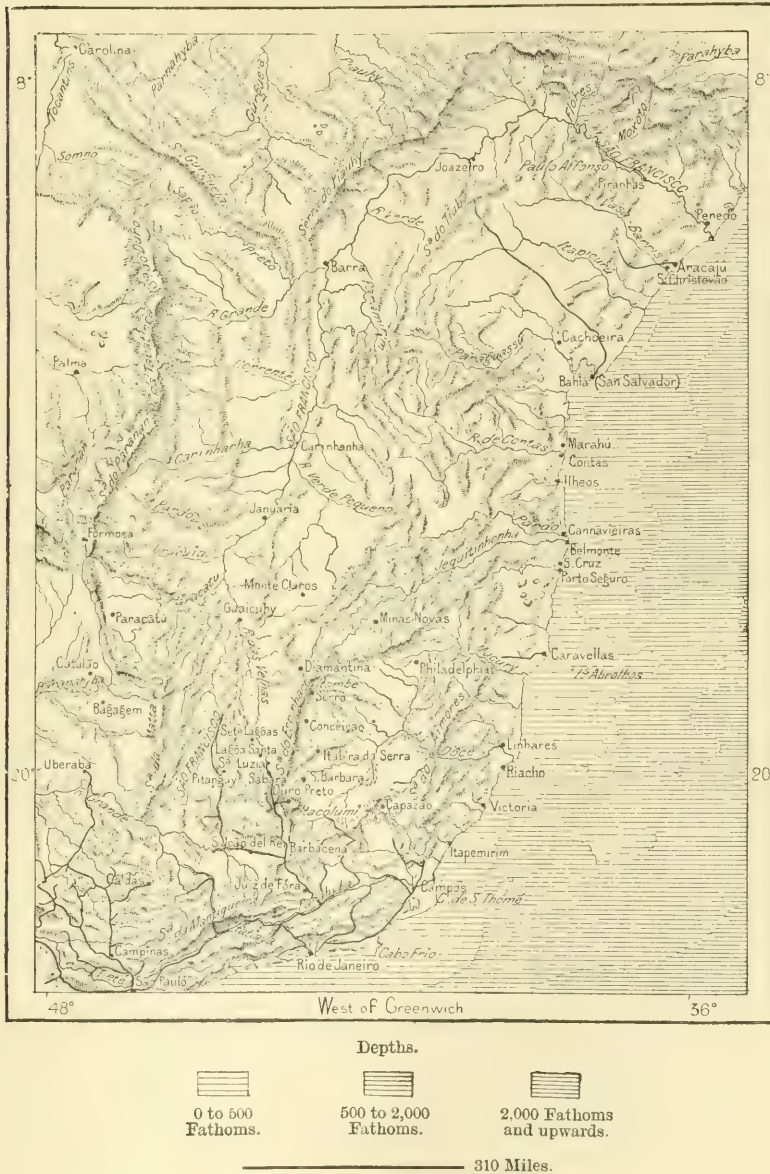
TOWNS OF BAHIA AND SERGIPE.

Below the Velhas confluence, where stands the little-frequented port of *Guai-cuby*, *Janucria*, or *Salgado*, is the last place on the S. Francisco within the Minas Geraes frontier. In the State of Bahia follow *Carinhanha*; *Bom Jesus de Lapa* with its "miraculous" grotto; *Urubu*, the "Vulture" town, facing Mount Pernambuco; *Barra*, at the Rio Grande confluence, chief place in the western districts of Bahia; *Pilão Arcado*, lower down on the left bank, a great centre of the salt industry. Here are vast beds of native salt still untouched by the miner.

Farther on, the main route penetrates into a region which abounds in inscribed rocks, dating from prehistoric times. The whole country is at present even less thinly inhabited than at the time of the Jesuit missions, and before the arrival of the whites, it appears to have been the centre of a large indigenous population.

Fig. 68.—RIO S. FRANCISCO BASIN.

Scale : 1,400,000.



Joazeiro, on the right bank above the Paulo Affonso Falls, has been chosen as the future terminus of the railway, which runs from the city of Bahia north-westwards to the S. Francisco valley. This riverside port already does a brisk

trade in rubber, gums, ores, and the salt brought from the neighbouring Rio Salitre. *Boa Vista*, another riverine station above the falls, is also to be connected by rail with Pernambuco through *Cubrobo*, *Agua*s, *Bellas*, and *Garanhuns*. Of these various projects to turn the cataracts one only is completed—the railway running through the States of Pernambuco and Alagoas between *Jatoba* and *Piranhas* heading the navigation on the lower S. Francisco.

Below the falls follow the busy towns of *Propria* in the State of Sergipe, and *Penedo* in Alagoas. *Penedo* dates from 1620, and occupies an important strategical position captured by the Dutch, who here erected a strong fort, some remains of which are still seen. At present all the vessels crossing the bar ascend to *Penedo*, where they ship cotton, skins, rice, and other produce in exchange for European wares.

In Sergipe, the “paradise of the Brazilian Union,” and smallest of the federal States, the population is concentrated chiefly in the valley of the Rio Sergipe, a tributary of the Cotinguiba. *Aracaju*, the present capital on the south bank seven miles above its mouth, is accessible to vessels drawing six feet, and this place ranks second in Brazil for the export trade in sugar. Here are also shipped cotton, brandy, and other produce brought down from *Maroim* and *Larangeiras*, and several railways are advancing northwards to *Capella* and westwards to *Simão Diaz*, future centre of various converging lines. *San Christovão*, the old capital, stands on the Rio Vasa Barris, which is obstructed by shoals and mudbanks, and accessible only to boats, although there are fully 12 feet of water on the bar.

At the southern extremity of the State the coast is indented by a third estuary, that of the Rio Real, towards which converge several watercourses. Of these the most important is the Rio Piahy, which flows near the town of *Estancia*, one of the chief agricultural centres of these coastlands.

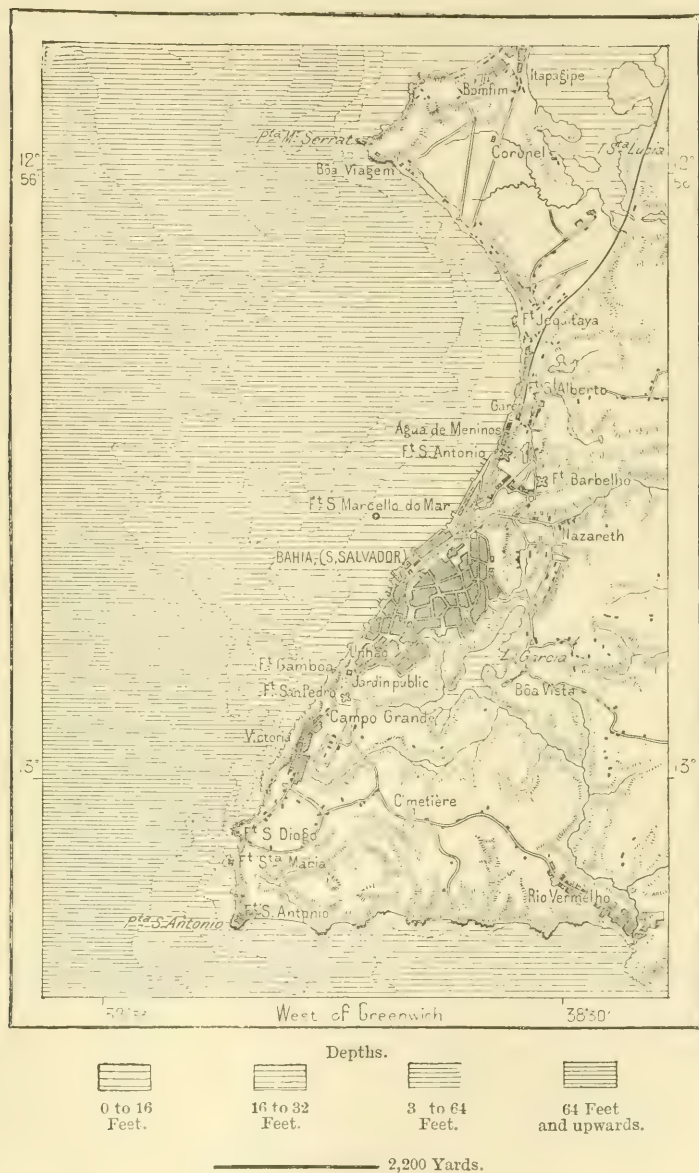
On the Bahia coasts all traffic tends to gravitate towards *San Salvador de Bahia*, or simply *Bahia*, at the entrance of the vast inlet of Todos os Santos Bay. *Bahia*, second largest city in Brazil, occupies the extremity of the promontory which shelters the magnificent inland sea. The headland on which it stands is the highest land round the whole basin, so that from a height of about 150 feet the upper town commands an extensive view of the shipping, bay, islands, roadstead, and surrounding plains. In the lower town the busy thoroughfares run parallel with the shore in the narrow space comprised between the water and the escarpments of the headland. The two quarters are separated by an intervening zone of verdure, where the graceful foliage of tall palms and leafy mangoes contrasts with the neighbouring domes and belfries. At night two parallel lines of light three or four miles long indicate the position of the upper and lower towns, which are connected by zigzags, an elevator, and two inclined planes traversed by locomotives. A small public garden separates the city proper from the fashionable suburb of *Victoria*, which extends southwards to the wooded heights at the extremity of the headland, indicated from a distance by the lighthouse of *San Antonio*.

According to the local records, the first settlement was here formed in 1510

by Diogo Alvares, a trader known to the surrounding natives by the name of Caramuru. But no regular colony was founded till 1549, when Thomé de Souza, governor of the captainries, took up his residence on Salvador hill. Bahia con-

Fig. 69.—ВАНІА.

Scale 1 : 90,000.



tinued to be the seat of the colonial administration till 1763, and long remained without a rival for population and commercial importance. In 1585 about half of all the 25,000 whites settled in Brazil were stated to be residents of Bahia.

At that time the blacks were much more numerous in Pernambuco; but Bahia

soon monopolised the slave trade, and despite of later legislation the local traders continued to be the chief importers of negroes down to the middle of the nineteenth century, introducing in some years as many as 60,000. Bahia was nearly ruined by the suppression of the traffic, and with difficulty recovered from the blow by developing its agricultural resources. The black element is still predominant in *la Velha Mulata*, the "Old Mulattress," as the place is popularly called.

At the time of the foundation the Jesuits established themselves in Bahia, which still retains its rank as the religious metropolis of Brazil. It was also in the seventeenth century the intellectual centre of Portuguese America; but its libraries, museums, and learned societies are scarcely worthy of a city with over 200,000 inhabitants. Bahia, however, possesses one of the two schools of medicine that have been founded in the republic. Its citizens are also distinguished amongst all Brazilians for their dignified bearing and culture, and they have at all times taken a considerable share in the government of the country. In one respect, Bahia is more "Brazilian" than Rio de Janeiro. It lacks the cosmopolitan character of the federal capital, and its houses, many of which are faced with varnished faience ware, are more like those of Lisbon. One of its churches has been entirely built of dressed stones imported from Portugal.

The harbour, sheltered from the east and south-east winds by the promontory, is exposed to the Atlantic swell rolling in through the broad entrance to the bay. Hence large vessels ride at anchor some distance off the quays. No attempt has yet been made to carry out the project to enclose a space of over 250 acres by means of two breakwaters, one over a mile long running from the northern extremity of Bahia to *Fort S. Marcello*, the other carried in the direction of the same fort from the southern quarter, where are situated the arsenal and custom-house. Sugar, tobacco, coffee, cotton, cattle, and hides are the chief articles of the export trade, which is valued at nearly £2,000,000 a year. The local markets are abundantly provided with provisions, and are specially noted both for the great variety and profusion of tropical fruits, and for the endless diversity of types—white, black, and half-breeds of every shade—observed in the picturesque groups frequenting them.

In the neighbouring waters a few whalers still pursue the cetaceans, which yield the train-oil used in lighting the city before the introduction of gas, but now forwarded to Europe. During the prevalence of southern winds the whales frequently penetrate into the bay, and are then pursued by boatmen armed with harpoons. About fifty are captured every year, and a spermaceti refinery has been established in the city. Others formerly existed in the neighbouring island of Itaparicá, where at the beginning of the present century most of the whalebone was prepared, which at that time was used instead of railing for enclosing gardens and courtyards.

Some deposits of coal have been discovered in Itaparicá, a long narrow island, with a town at its northern extremity. The soil is extremely fertile, and the island is noted for the excellence of its produce no less than for its genial climate. It is locally known as the "Europe of the poor," because it is much frequented

by artisans and others who have not the means of making the *grand tour* in the Old World. During the war of independence Great Britain offered to take Itaparicá in payment of the debt due to her by Portugal. But this would be equivalent to surrendering the key of Brazil to the English, and the offer was declined.

On the Atlantic slope of the peninsula are situated various suburban retreats, such as *Rio Vermelho* and *Bomfim* with a church reputed to be the richest in Brazil. The shores of the bay are also studded with numerous trading places, which communicate with Bahia by means of little steamers said to number over a thousand.

Below *Santo Amaro*, on the river of like name, which enters the bay at its northern extremity, the State has established an agricultural institution and model farm. *Cachoeira*, on the Rio Paraguassu, which debouches on the west side of the bay, collects the tobacco, coffee, fruits, and other agricultural produce of the district, and forwards it to Bahia either direct or through its out-port, *Maragogipe*. Farther north lies *la Feira de Santa Anna*, "Saint Anne's Fair," chief market for the cattle of the backwoods and of the S. Francisco valley.

A viaduct of four spans, each 300 feet, the most remarkable structure of the kind in Brazil, connects Cachoeira with its suburb of *S. Felix* on the right bank, terminus of the railway ascending the Paraguassu valley to the diamantiferous district of Lenções. In 1845, when first discovered, the mines of this district yielded diamonds to the value of £2,650. The blackish amorphous carbonado diamonds used in piercing tunnels are chiefly obtained at Lenções and the neighbouring *Chapada Diamantina* west of the Paraguassu valley.

Nazareth, at the head of the navigation on the Jaguaripe estuary south of the fertile *Itaparica* Island, supplies Bahia with manioc and other produce brought by a railway from the interior. Another line runs from Bahia due north to the station of *Alagoinhas*, where it bifurcates. One branch traverses the sugar and tobacco plantations of the coast as far as *Timbo* near the Rio Itapicuru, while the other runs north-west towards *Villa Nova da Rainha*, whence it is to be continued to Joazeiro above the S. Francisco Falls. Near *Monte Santo*, east of this branch, was discovered in 1784 the famous meteorite of Bendego, a huge block weighing 114 cwt., which was afterwards removed at great expense to the museum of Rio de Janeiro.

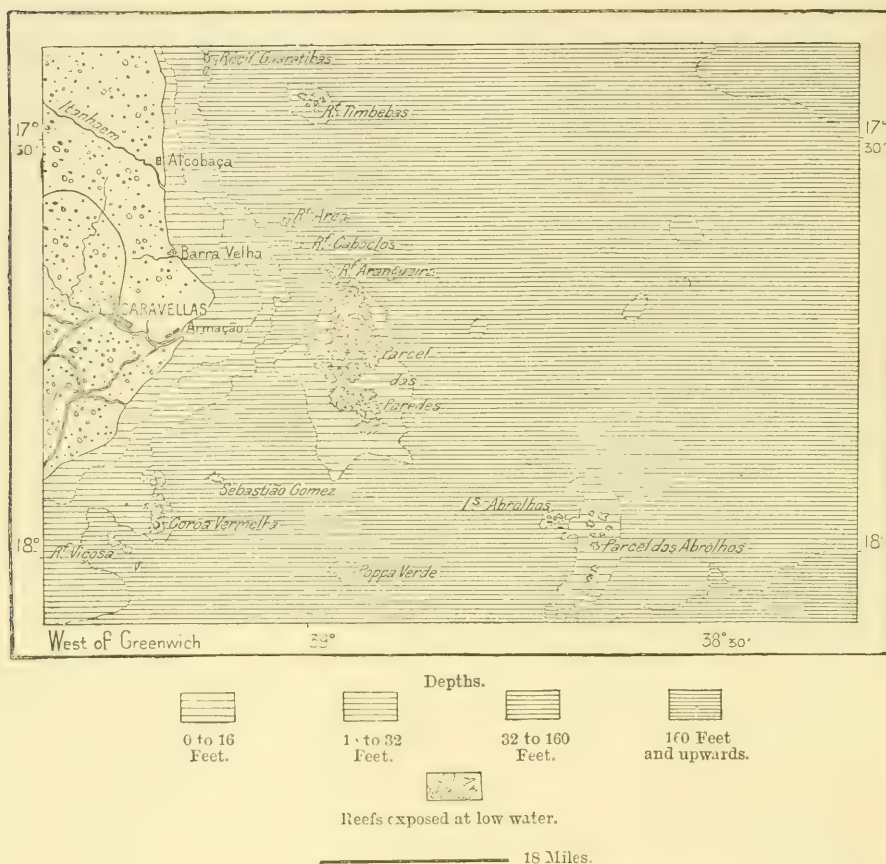
South of Bahia follow the coast towns of *Valença*, said to produce the best cotton fabrics in Brazil, *Taperoa*, *Camamu*, with the excellent harbour of *Acarahy*, *Contas*, *Ilheos*, founded in 1530, *Canavieiras* in the Jequitinhonha delta, formerly a place of exile for political prisoners, *Belmonte*, which gives its name to the Lower Jequitinhonha. In the upper reaches of this river the Paulistas founded the famous mining town of *Minas Novas* in the territory of the Macussi Indians early in the eighteenth century. The place rapidly prospered, and as rapidly declined, owing to the severe fiscal measures taken to protect the interests of the Crown. The yellow topazes and aquamarines of Minas Novas have enriched many collections.

A railway running from the port of *Caravellas* at the southern extremity of

the State of Bahia to the auriferous upland valleys, passes the town of *Philadelphia* (*Theophilo Ottoni*), centre of the agricultural colonies founded on the banks of the Mucury. This line, which is to terminate at Guaicuby at the confluence of the Rio das Velhas with the S. Francisco, gives a decided advantage to Caravellas over all the other seaports of South Bahia. Hence immigration has set in this direction, while

Fig. 70.—CARAVELLAS AND SURROUNDING REEFS.

Scale 1: 1,000,000.



Porto Seguro is almost abandoned, except by the fishing smacks which capture the garupa, a species of salmon found among the Itacolumi and Abrolhos reefs.

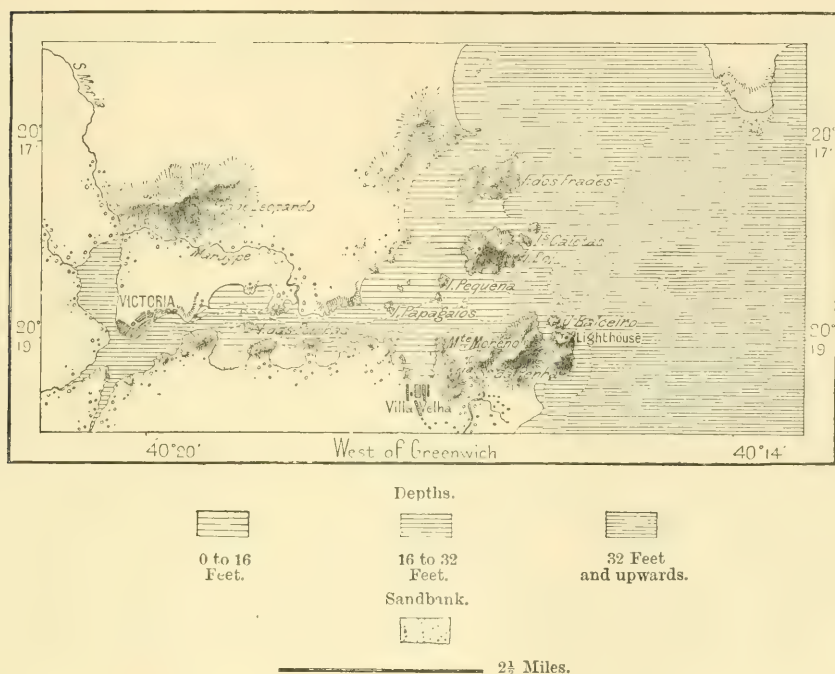
TOWNS OF ESPÍRITO SANTO.

S. Matheus, in the southern part of the State of Espírito Santo, forwards its coffees and manioc through the port of *Conceição da Barra*. Excellent cotton is grown in the district of *Pessanha* on a northern affluent of the Rio Doce. South of this river follow the little seaports of *Riacho*, *Santa Cruz*, near the bay of Espírito Santo, which gives its name to the State, and on which is situated the capital *Victoria*, formerly *Capitania*.

This place stands at the south-west extremity of the island formed by the narrow *Maruyapé* channel, which is here crossed by a wooden bridge. On the mainland are seen the remains of the old capital, *Villa Velha*, with its imposing group of churches and convents. Farther east the entry of the estuary is indicated by the isolated heights of Penha (430 feet), and Moreno (690 feet), the former crowned by a church, the latter by a lighthouse. To the north, beyond the Frade Leopardo peak rises the still loftier three-crested Mestre-Alvarez, contracted to Mestialvé (3,220 feet). According to Mouchez, this is a long extinct volcano, still containing sulphur beds. Thanks to its great height and isolated position near

Fig. 71.—VICTORIA.

Scale 1 : 140,000.



the coast, Mestialvé is one of the most striking landmarks on the whole of the Brazilian seaboard.

Since the completion of the harbour works, Victoria is accessible to large vessels, the bar having from 16 to 20 feet even at low water. Its trade is rapidly increasing, and thousands of immigrants are now landed at this port, which has become entirely independent of Rio de Janeiro, in its relations with Europe. The colonists already number about 30,000—Germans, Poles, Swiss, Tyrolese, Portuguese, and especially Italians, who greatly outnumber all the rest. They settle chiefly in the southern parts of the State, near *Anchieta* (formerly *Benevente*), *Alfredo Chavez*, *Itapemirim* and *Cachoeiro*.

Anchieta perpetuates the name of the Jesuit missionary, who had at one time gathered together as many as 12,000 Indians from the surrounding forests: Under

the rule of the priests, the "reductions" (stations) were kept aloof from all contact with the whites, and even after their expulsion from Brazil the Jesuits stipulated that an "inalienable" space of six square leagues should be left round the Indian villages. But their backs were scarcely turned when the reservation was invaded. Some of the recent arrivals, still under government control, receive a yearly subsidy, besides seed, corn, and cattle. But most of the settlers are already "emancipated," that is to say, are thrown upon their own resources, cultivating small freeholds at their own risk. Coffee, which is the chief crop, yielded in 1892 about 3,930,000 cwts. But manioc, rice, beans, and other provisions are also raised for the surrounding markets.





CHAPTER X.

PARAHYBA BASIN.

STATE OF RIO DE JANEIRO AND NEUTRAL TERRITORY.



THE State in which is situated the capital of Brazil, forms a land of transition between the tropical and temperate zones. At Cape Frio, the direction of the coast-line, which had a general southern trend below Cape S. Roque, changes abruptly to the west, and after describing a regular curve resumes its normal course from north to south with some points to the west. The southern tropic passes just south of the State of Rio de Janeiro, and thus coincides with the trend of the seaboard at this point.

On the other hand the Rio Parahyba, which rises on the plateaux of S. Paulo, at the same divide where the upper affluents of the Parana have their source, flows north-east in a deep trough forming a natural boundary to the triangular space comprising the State of Rio. On its upper slopes this river valley belongs to the temperate plateaux, and in its lower course to the tropical zone.

Since the early days of the discovery, the famous bay of Rio de Janeiro has played a conspicuous part in the history of the New World. After the heroic ages, when French and Portuguese contended for the possession of Nictheroy, the surrounding region has been explored in every direction, and hundreds of observers have contributed to our knowledge of the land in all its aspects. Nevertheless, it still lacks large scale maps possessing even approximate accuracy. Excellent charts, however, will soon be available at least for the city and the surrounding neutral municipality, the triangulation of which is now completed. Rio is the most densely peopled district in Brazil, having a population of nearly 2,000,000 to an area of 27,000 square miles.

PHYSICAL FEATURES.

The mountain barrier enclosing the Parahyba valley on the north-west would form the most natural frontier of the State ; but the political parting-line, instead

of uniformly following the crest of this range, coincides sometimes with the course of some affluent, sometimes with that of the Parahyba itself. Nevertheless, Itatiaia, the loftiest group of the Serra Mantiqueira, stands precisely at the south-western angle of the State, where it is conterminous with the territory of S. Paulo. This volcanic mass, which scarcely falls much below 10,000 feet, probably owes its great relative elevation to its comparatively recent origin. The summit, which is occasionally streaked with snow, was first ascended by the botanist, Glaziou, in 1871.

Towards the north-east the Serra Mantiqueira decreases gradually in height and presents some gaps, one of which, the João Ayres Pass (3,620 feet), has been utilised for the trunk railway, which ramifies westwards in the interior of Minas

Fig. 72.—ITATIAYA RANGE.

Scale 1 : 650,000.



Geraes. But various lateral off-shoots are thrown off, which in many places present the aspect and take the name of "serras."

Beyond the deep trough of the Rio Parahyba, a somewhat regular chain is developed parallel with the Serra Mantiqueira. In the State of S. Paulo this chain is known as the Serra do Mar, or "Coast Range"; but in Rio it takes various names, according to its varying height, trend, and general aspect. Amongst these sections the most noteworthy is the famous Serra dos Orgãos, "Organ Range," which stretches north-east of the capital, and which is so called from the somewhat columnar form of its escarpments, showing a vague or fanciful resemblance to the pipes of an organ.

An isolated peak near Therezopolis has received the equally fanciful name of

"Finger of God." The Pedra Assu, or "Great Stone," culminating point of the organ range, attains, according to Glaziou, a height of 7,325 feet. Towards the north-east, where it is pierced by the Rio Parahyba, the isolated Frade de Macabé

Fig. 73.—PEAKS OF THE ORGAN RANGE, NEAR THIÉREZOPOLIS.

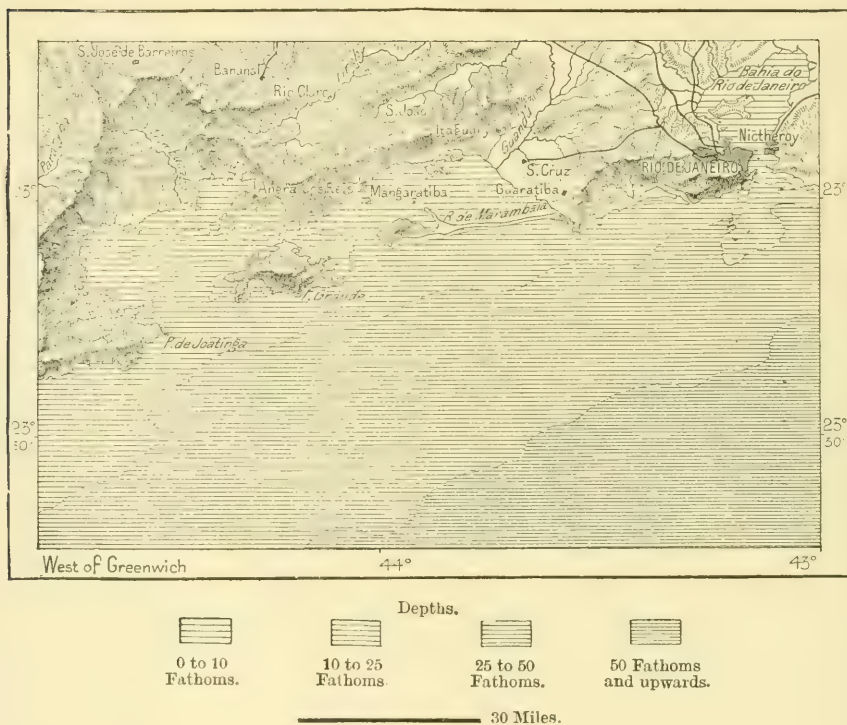


still retains an elevation of 5,740 feet, while the three peaks of Mount Matheus, in the Serra das Almas, are estimated at 6,170 feet. The railway from Nictheroy to Nova Friburgo crosses the Organs at an altitude of 3,590 feet.

Westwards, the Organ range is continued by the Serra de Tingua, which has an extreme height of 5,410 feet. This range, being of igneous origin, with obliterated craters, presents a marked contrast to the neighbouring gneiss and granite mountains. West of the Serra de Tingua, a railway long regarded as a marvel of Brazilian enterprise surmounts the Serra do Mar by a series of steep gradients and eighteen tunnels, the highest point reached being 1,356 feet. Farther on towards the S. Paulo frontier the nearly isolated Serra Bocaina has several peaks 5,000 feet high, facing the superb Itatiaya group on the other side of the upper Parahyba valley. On the seaward side of the Serra do Mar a few

Fig. 74.—RIO DE JANEIRO SEABOARD.

Scale 1 : 1,500,000.



narrow heights, rising abruptly above the sea, represent ancient islands now joined to the mainland. Such are the cones encircling Rio de Janeiro Bay, the entrance to which is dominated by Mount Tijuca (3,360 feet), where Agassiz thought traces of former glaciation might be detected.

RIVERS.

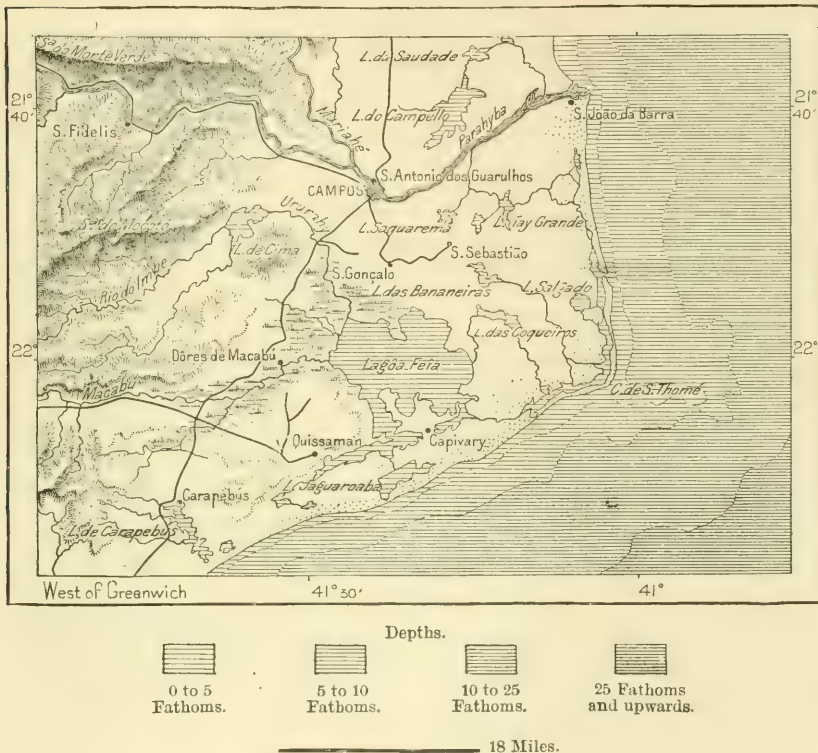
The Parahyba do Sul, or simply Parahyba, has its sources close to the sea at the south-east extremity of S. Paulo. It flows first south-west, in the very opposite direction to the course which it afterwards takes to escape from its rocky

barriers. After receiving the Rio Preto from Itatiaya and the Parahybuna, "Black River," it is joined by the Dous Rios above the S. Fidelis Gorge. Below this point, where it is only 230 feet above sea level, it becomes a navigable stream, winding through rich alluvial plains to the zone of its marshy delta.

The sediment washed down by the turbid waters of the Parahyba has formed extensive sandbanks north of Cape S. Thomé, which frequently shift their position during the floods and storms, and reduce the water at the bar to little over six

Fig. 75.—MOUTH OF THE PARAHYBA AND CAPE S. THOMÉ.

Scale 1 : 1,100,000.



feet. The Parahyba, a term of doubtful meaning, has a total length of about 600 miles, a drainage area of 26,000 square miles, a navigable course of 50 miles, and a mean discharge of 53,500 cubic feet per second.

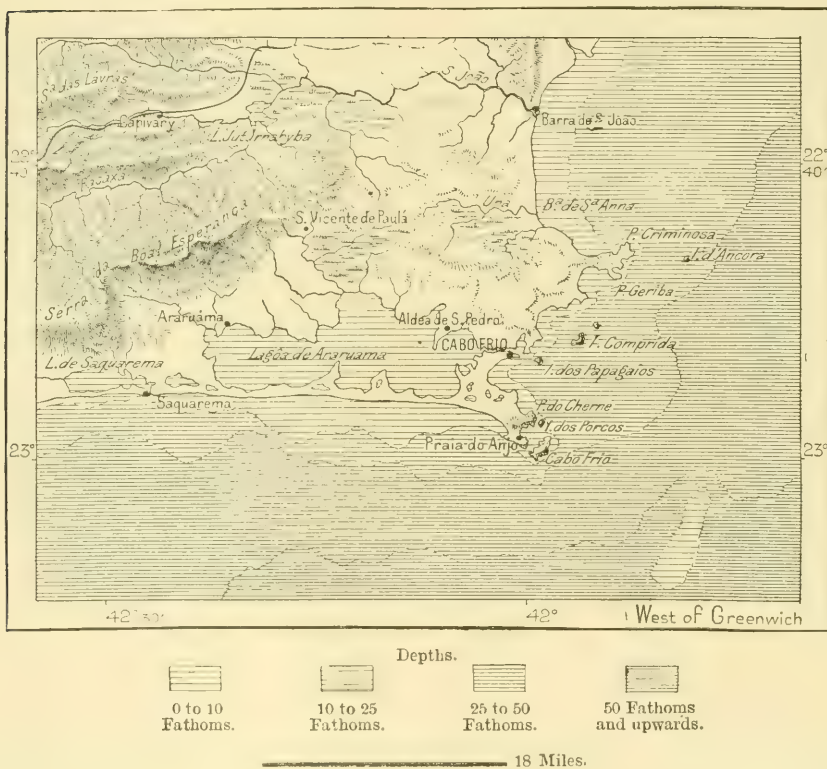
On the narrow seaward slopes of the coast range there is no room for the development of any large streams. The Macacu, which enters the north-west side of Rio Bay, although one of the largest, has a course of less than 60 miles. But if the seaboard lacks copious rivers, it abounds in stagnant lagoons and land-locked inlets. South of the Lower Parahyba the Lagoa Feia, an old marine gulf now separated from the sea by a strip of sands, has an average superficial area of 170 square miles, and communicates through shallow creeks with numerous other lagoons dotted over the low-lying coastlands. Northwards it is connected, during

the floods, with the Parahyba; eastwards, with the chain of backwaters on both sides of Cape S. Thomé; south-westwards, a channel, or rather, a broad ditch, traversing several other lagoons, carries to the Macahé the overflow of the Lagoa Feia.

West of the Archipelagoes and peninsular headlands terminating at Cape Frio, several sheets of water follow along the low-lying tract comprised between the sea and the foot of the Serra do Mar. Araruama, largest of these basins, maintains constant communication with the ocean through a passage north of Cape Frio giving free access to the tides. But the other lagoons are closed, and after long

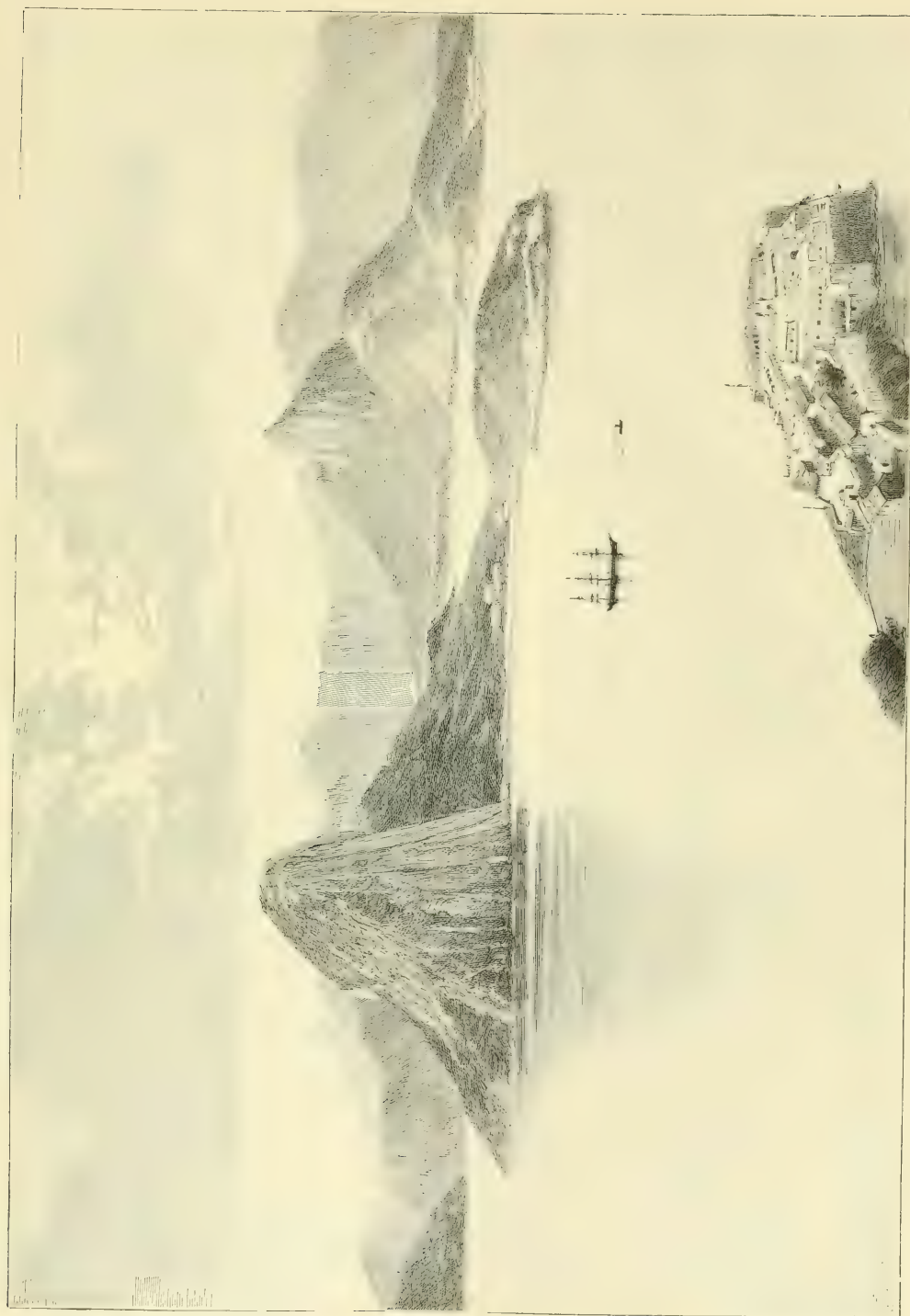
Fig. 76.—CAPE FRIO.

Scale 1: 950,000.



periods of rain they have to be opened by cuttings in the intervening sandy cordons. These lagoons might be easily transformed to productive salines, and they were often used as such even under the Portuguese rule, although in order to protect the monopoly of the Setubal salines, the extraction of salt was forbidden by the royal edicts of 1690 and 1691.

The marvellous bay of Rio de Janeiro, "River of January," which has given its Portuguese name to the Brazilian capital, and which was formerly much more aptly named Nictheroy, "Hidden Water," by the surrounding Tupi Indians, belongs in its northern extremity to the type of the coast lagoons. It is, in fact,



ENTRANCE TO RIO DE JANEIRO BAY.

at once a gulf and a lagoon, while the entrance resembles a strait. Here the granite rocks approach on both sides so closely that only a passage is left 1,600 yards wide with 15 fathoms on the sill. Inside this passage the east and west shores are indented with semi-circular inlets, whose intervening headlands are continued by islands and islets far into the water. Beyond these labyrinthine groups of rocky and verdant heights, the bay expands into a vast inland sea, with shelving beach exposed and flooded at each ebb and flow. With its 300 islands the land-locked basin covers a space of 170 square miles, over a third of which is deep enough for the largest vessels. The deeply indented shores further present a succession of ramifying creeks, where the shipping finds an unlimited extent of perfectly sheltered anchorage. Nevertheless some parts of the bay are slowly silting up, and some of the old mooring places have had to be abandoned.

Outside the inner coast-line formed by the bay, the regular marine beach is indicated west of the Rio heights by the so-called *restinga* of Marambaia, a narrow strip of sand running nearly in a straight line between a headland and an adjacent islet. Farther on, the peak of the Ilha Grande, over 1,000 feet high, follows in the same direction, projecting its spurs towards a still more elevated peninsular promontory, which shuts off the gulf of Paraty from the ocean. Along the line of all these islands and peninsulas the marine waters preserve their normal depth, and nowhere show any indication of shoaling.

CLIMATE.

Within a narrow space mountains, valleys, and coastlands offer so many parallel zones, each with its separate climate. To the contrast of varying temperature is added the play of alternating sea breezes, due to the trend of the two sections of the coast, one disposed from north to south, the other from east to west. But everywhere the humidity is relatively very great throughout the year, although the rainfall is heaviest in summer, when the weather is also most stormy under the influence of the west and north-west gales. The most prevalent winds, however, are those of the southern trades, which usually blow from the south-east.

Taken as a whole, the State of Rio de Janeiro is not one of the healthy regions of Brazil. The numerous marshy tracts on the coast are dangerous at all seasons, especially for strangers. Besides the endemic agues, these districts are visited by epidemics of yellow fever, which are fatal to all white settlers. But the mountain slopes and breezy heights offer health resorts, where the European may recover from the debilitating effects of a residence on the lowlands. The climate of Rio is said to have undergone a change since the destruction of the great forests. Rains and storms would appear to have become far more irregular than formerly.*

* Meteorological conditions of Rio:—

	Latitude.	Altitude.	Temperature.			Rainy Days.	Rainfall.
			max.	mean.	min.		
Rio . .	22° 54' S.	220 feet.	102° Fahr.	73° Fahr.	50° Fahr.	127	43 inches.

FLORA AND FAUNA.

The flora and fauna also, originally analogous to those of the neighbouring State of Espirito Santo, have already been greatly modified, at least in the district surrounding the capital. Here the primeval forests have everywhere disappeared except on the unhealthy parts of the plains, or in the less accessible scarps of the mountains. Most of the large animals have also vanished. Tapirs are no longer met anywhere, and jaguars only in the remoter parts of the backwoods. The former herds of peccaries and other *porcos do matto*, "forest swine," are reduced to a few rare bands on the verge of the outlying settlements, and even some of the bird species have diminished in number. But on the other hand as many as 800 species of butterflies and over 2,000 of insects may still be found in a narrow radius round about the bay.

INHABITANTS.

Like the animals, the aborigines have all disappeared within the limits of the State, nor can even the half-caste descendants of the old Tamoyo (Tamoi, Aiam) race be any longer recognised. As friends of the French, these were hostile to the *Peró* (Portuguese), who sought allies amongst the Mbarancayas ("Cats") of Espirito Santo, and by their aid got the better both of the French and of the Tamoyos. These were mostly exterminated, while the rest escaped, and are now said to be represented by the Tupinambas, or Tupinambaranas, of the large island of that name below the Madeira confluence.

The Paulistas, who hunted down the aborigines to supply the mines and plantations with slaves, also contributed to the destruction of the Tamoyos, who were of pure Tupi stock and speech. They were also cannibals, at least to the extent of eating the enemy slain in battle. The early European travellers, such as Hans Staden, Jean de Léry and Magalhães de Gandavo, all agree in their descriptions of the usages of these maritime Tupi tribes, and their statements are in nearly complete agreement with those of Yves of Evreux and Claude of Abbeville respecting the Indians of Maranhão, who belong to the same widely diffused ethnical family. All alike painted their bodies with the red rucu dye, and black with genapa; they also disfigured themselves to a far greater extent than did the Botocudos by the insertion of various objects in the lips, ear lobes and other parts of the face. They pierced the under lip of the children, gradually enlarging the aperture until it was wide enough to receive a wooden disk or some stone ornament. They also pierced the cheeks for the insertion of pieces of crystal, and took pride in covering the face with artificial protuberances, and plastering their bodies with feathers and thorns. Yet all were robust and healthy, and amongst them there were scarcely any lame or halt, maimed or distorted.

These Tupi tribes lived in large cabins sometimes 150 or 160 feet long, with as many fire-places as there were separate family groups. All had their hammocks disposed along the whole length of the common corridors, the vast dor-

mitory resembling the lower deck of a galley. They dwelt together in peace; the friend of one was the friend of all, and whoever had anything to eat, however little it might be, shared with all present.

Marriage was strictly endogamous, that is, within the tribe, and the Tamoyos lawfully married their nieces, daughters of their own brothers or sisters. According to Gandavo, some of the women, scorning the occupations of their sex, dressed and decorated themselves like the men, carried the bow and arrows and hunted in their company. Each of these viragoes was attended by another Indian woman whom she called her helpmeet.

Trials of endurance were held in high honour amongst the Tupinambas. The chief, entering the cabins, gashed the young men on their legs with a very sharp fish-bone, to teach them to suffer without complaint, and thus earn the name of men and warriors. In battle the combatants hurled insults and curses at each other, shouting from camp to camp: "May all evils befall you; to-day I will make a meal of you!" And in fact the victor consumed the flesh of the vanquished. Such was the renown attached to the exploit that henceforth the Indian warrior took a new name, and also bestowed one on his wife, selecting it from some fish, fruit or flower.

Isolated amid these Tupi peoples were the Watecas (Goytacazes), "Runners," who were akin to the Botocudos, and who occupied the lower districts of the Parahyba still from them called "Campos dos Guatacazes." These were the wildest of all the coast Indians; and such was the terror inspired by their name that, in the popular imagination, they acquired gigantic proportions and super-human strength.

Near their camping-grounds, amid the lagoons, they heaped up the remains of their vanquished foes, which formed islands amid the lagoons of their watery domain. After over a century of fierce resistance to the Portuguese, they were at last overcome in 1630, when those surviving the battlefield either escaped to the backwoods on the Minas Geraes frontier, or else were removed to an agricultural reservation. Those of the woodland cut their flowing locks and shaved the crown of the head, whence the term *Coroados* ("Crowned") applied to them by the Portuguese in common with many other tribes adopting the same style of headdress.

Nearly all the aborigines having thus disappeared, their place has been taken by Africans and by immigrants from almost every European land. In no other part of Brazil are the people of a more cosmopolitan character. Some of the inland settlers from Germany and Switzerland have even partly preserved the national type; while the great trade of the capital with Europe and North America has given it almost a foreign aspect.

TOPOGRAPHY.

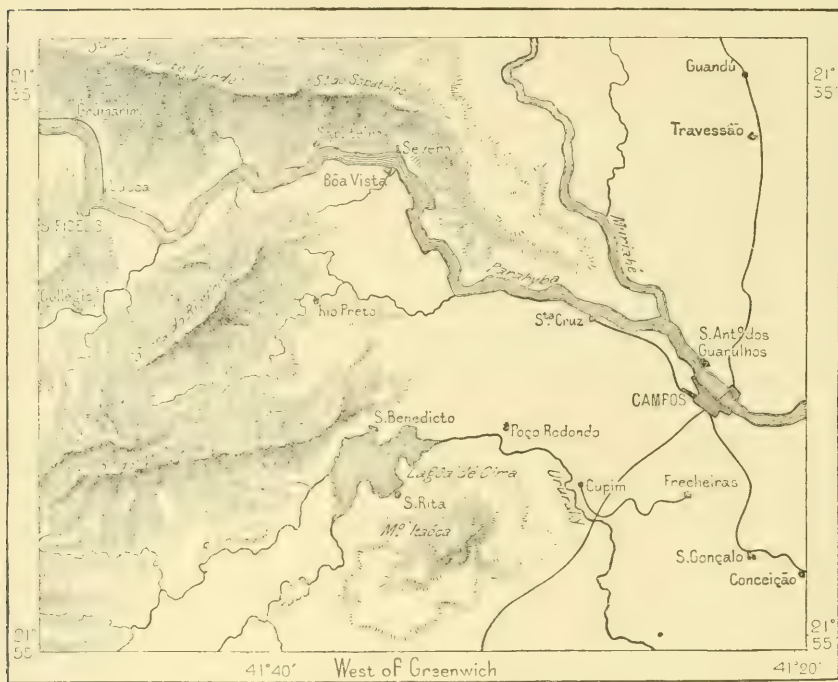
In the Parahyba valley all the centres of population depend almost for their very existence on coffee, the staple product of Brazil. Such are *Rezende*, domi-

nated by the loftiest summits of the Serra Mantiqueira; *Barra Mansa*, whose name ("Easy Bar") indicates the mild character of the neighbouring rapids; *Barra do Pirahy*, at the confluence of the Rio Pirahy; *Parahyba do Sul*, named from the mainstream itself; *Entrerios*, at the Parahybuna confluence.

Other towns, such as *Rio Claro*, *Vassouras*, *Valença*, and *Cantagallo*, although not situated in the Parahyba basin properly so called, belong, nevertheless, to the same agricultural zone, and have merely a local importance. On the other hand, *Petropolis*, *Therezopolis*, and *Nova Friburgo*, although lying on the Parahyba slope, belong to the capital, of which they are advanced suburbs and health

Fig. 77.—CAMPOS AND THE LOWER PARAHYBA.

Scale 1 : 1,100,000.



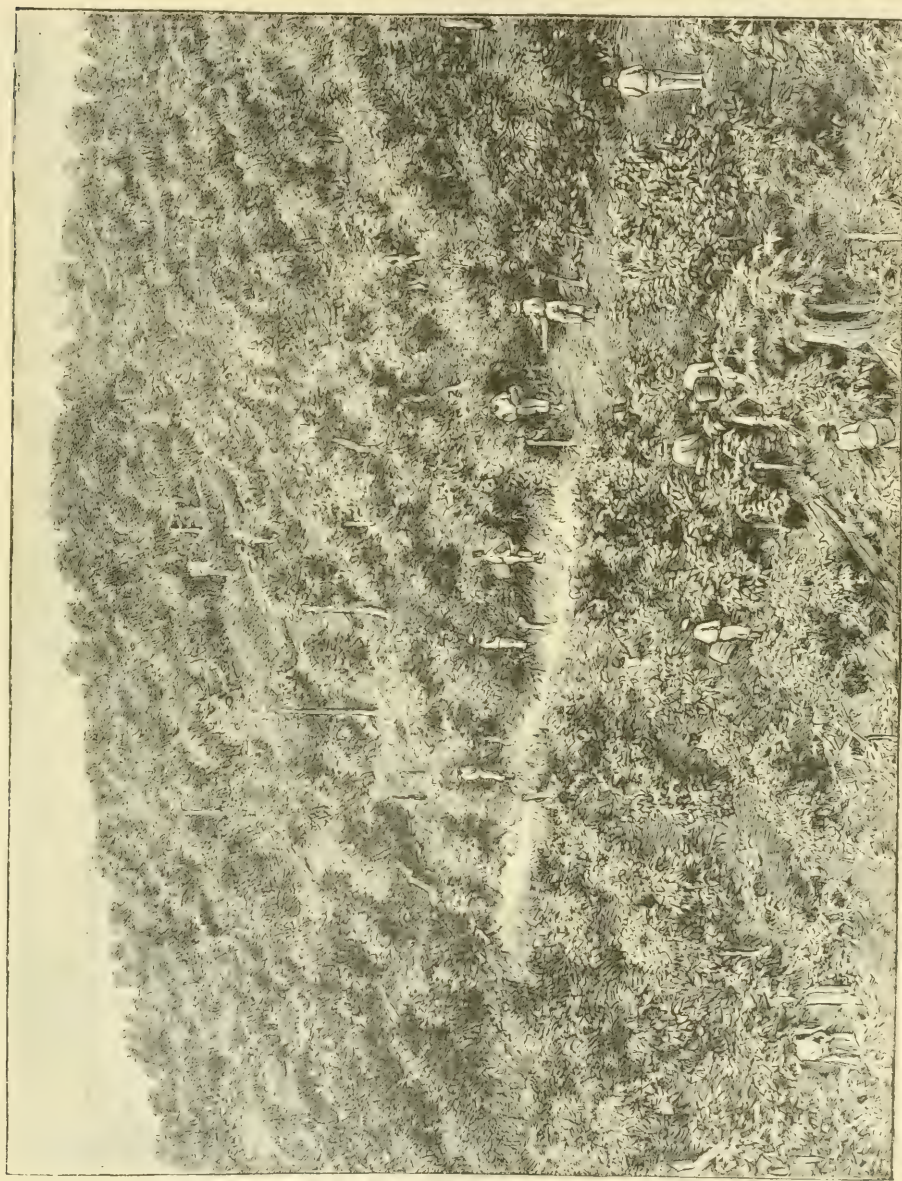
resorts on the breezy uplands. An older settlement is *S. Fidelis*, below the Dous Rios confluence, formerly peopled by Coroados and Puri Indians. The Puri, that is, "Brigands," as their neighbours called them, still survived in the tribal state down to the beginning of the nineteenth century. Their small stature and Mongolian physiognomy were the astonishment of all travellers.

Campos, on the south (right) bank of the Parahyba some 38 miles above its mouth, lies in an extremely fertile district at the head of the fluvial navigation and below all the affluents. Here were established the blockhouses and depôts for the early settlers in the valley; here the planters built their sumptuous residences; here converge all the natural routes and railways of the district; and here the

engineers have bridged the river with a fine viaduct, replacing the old *barca-pendula*.

Campos has also become a great centre of the sugar industry, where from 50,000 to 60,000 tons of cane are annually crushed. Unfortunately, the outlets of

Fig. 78.—COFFEE PLANTATIONS.



the local industries have all bad harbours. Such are *S. João da Barra*, near the mouth of the Rio Parahyba, and much farther south *Imbetiba*, a suburb of *Macahé*, at the mouth of the river of like name. *Macahé* communicates with Campos by a series of creeks and lagoons forming a continuous waterway about 56 miles long.

An Indian village stood on this spot in the middle of the sixteenth century, and Jean de Léry speaks of an inaccessible bluff rising like a tower on the neighbouring coast, which glittered in the rays of the sun with such dazzling brightness that it might be taken for an emerald. It is difficult to identify this rock, unless it be the superb Frade de Macahé, which is seen in the west rising like a pyramid above the Serra do Mar.

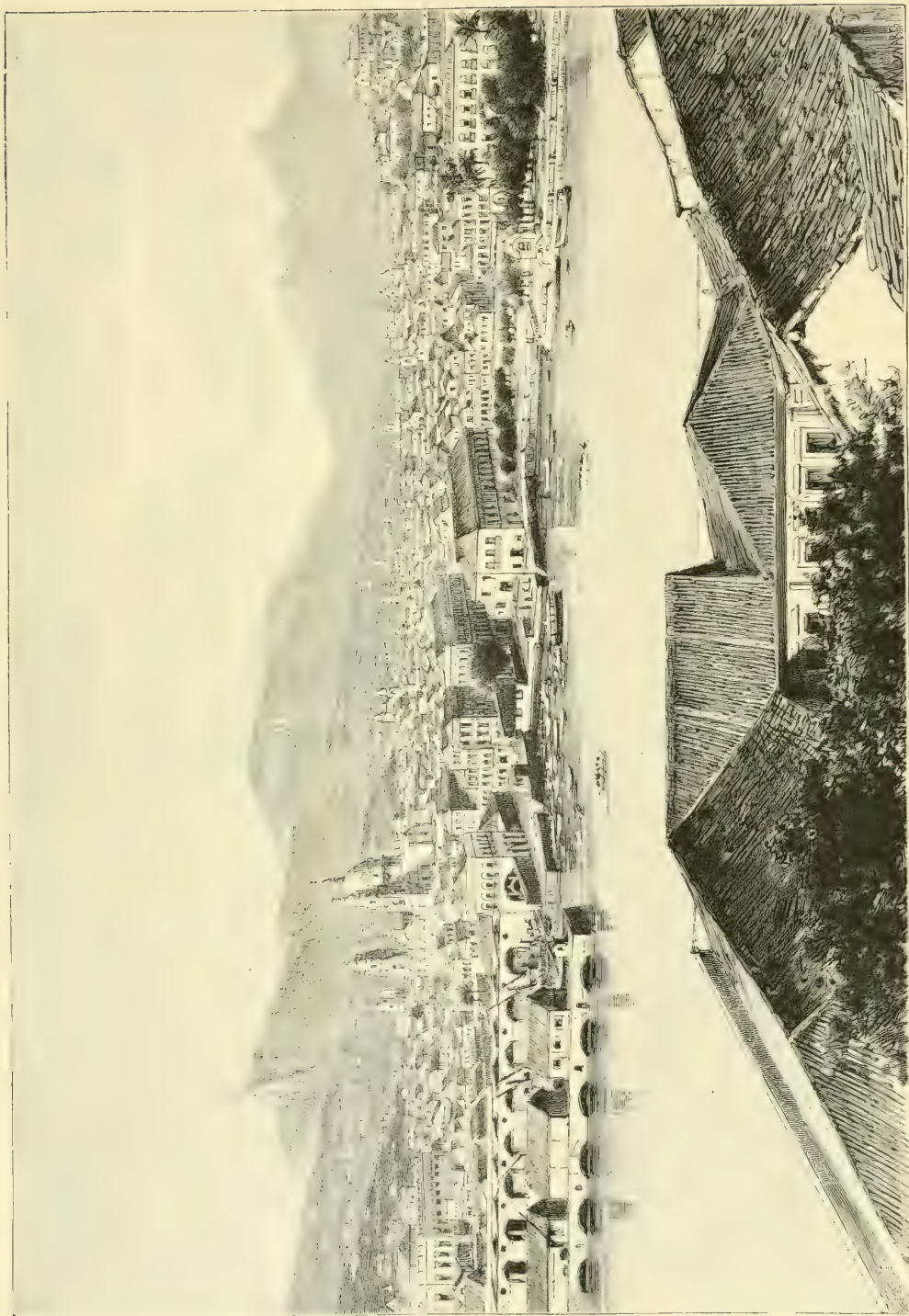
Cape Frio has given its name to a town standing on a deep creek at the head of the Itamarica passage. Like the other parts of the Serra Abaixo, the Brazilian "Piedmont," *Cabo Frio* exports sugar, molasses, and rum, besides provisions for the capital, from which it is distant about 60 miles. Here also large quantities of prawns, lobsters and sardines are preserved, and a special industry is the grinding of shells to a powder, which makes an excellent lime much valued by the builders of the capital. Even after their expulsion from the bay of Rio de Janeiro, the French still continued to visit the secluded district of Cabo Frio, where, by the aid of their Tamoyo friends, they obtained cargoes of brazil-wood and of other local produce. In order to put a stop to this "contraband" trade, Philip II. founded the settlement of Cabo Frio in the year 1575.

RIO AND NEIGHBOURING TOWNS.

Two cities facing each other at the entrance of Rio Bay take their name from the "Hidden Water"—*Nietheroy* (*Nitherohy*), present capital of the State, on the east side, and on the west *Rio de Janeiro*, metropolis of Brazil. One perpetuates the old Indian name of the basin; the other bears the Portuguese title recording the fact that, when first discovered, the vast inlet was taken for the mouth of some great "rio" or "river." But both, despite the differences of their political administration, constitute essential parts of the same organism.

Rio presents an imposing aspect as it is sighted by the traveller who, after rounding the headland of Cape Frio, commands a full view of the island-studded waters, with the superb Itaipu peak on the east side of the entrance. Farther on the heights back of Rio come gradually into view—a world of domes, pinnacles, needles, limited westwards by Marambaia Bay. In the distant background appear the hazy outlines, terraces, crags, and precipices of Gavia, Tijuca, Corcovado, the whole presenting such a prodigious variety of peaks, crests, summits, that the separate forms are lost in a chaos of picturesque mountains, stretching away to the rugged Serra da Estrella and the columnar escarpments of the Organ Range.

Beyond Cotuntuba Island the imposing mass of the Pão d'Assucar ("Sugar Loaf") is seen dominating the entrance on the west side, and towering to a height of 1,270 feet above the surface. A headland projecting from the foot of this conspicuous rock is crowned by *Fort São João* continued seawards by another fortified islet. The entrance, 1,600 yards wide, is thus disposed in two channels, one on the west, little used by shipping, the other on the east 1,000 yards broad, giving easy access to the largest vessels. Here the long flat terrace of the *Santa Cruz* peninsula with its masked batteries, forms the chief bulwark of the capital,



RIO DE JANEIRO—GENERAL VIEW TAKEN FROM COBRAS ISLAND.

and is supported within the bay by other defensive works crossing the promontories on both sides. The elongated islet of *Villegagnon* facing the city proper is also fortified and used as a marine barracks and outpost of the arsenal which occupies the nearest headland over half a mile distant.

Villegagnon, formerly *Serigipe* (*Sergipe*) marks the site of the first European settlement by the Huguenot adventurer who here erected *Fort Coligny* in 1555. A few years later the victorious Portuguese captain, Estacio de Sá, established himself on the mainland near the Pão d'Assucar. After his death this military station was removed to the *Morro do Castello* promontory, at the northern foot of which were grouped the first houses of *S. Sebastião do Rio de Janeiro*, in some documents called also Sebastianopolis. The heart of the city which was gradually developed round this position during the eighteenth century, stretches over a mile east and west, being limited on the south by the *Morros do Castello* and de *Santo Antonio*, and northwards by the *S. Bento* and *Conceição* heights.

Within this narrow space, houses, streets, and squares are necessarily crowded together, giving difficult access to carriages, although most of the thoroughfares are laid down with tramways. The mean and commonplace houses receive little sunshine, and gloom prevails in all the large warehouses. Yet in the middle of this wretched, badly-paved quarter, with its open drains and close atmosphere, is situated the *Rua do Ouvidor*, chief resort of merchants, loungers, and fashionable society.

But this old quarter, traversed by the *Rua do Ouvidor*, forms a mere fragment of the present metropolis, which has overgrown its natural limits in every direction. After covering the low saddleback between the *Castello* and *Santo Antonio* heights, it has spread out along the shores and tributary valleys, successively absorbing all the surrounding hamlets, villas, and other groups of rural habitations.

Gradually the hills near the waterside have been encircled like islands by the surging tide of buildings, while the more inland heights project like peninsulas amid the semi-circle of expanding suburbs. Thus have been formed the districts of *Lapa* on the creek of like name at the foot of the *Santa Thereza* hills; *Flamengo* farther south; *Laranjeiras*, the "Orangeries," between the *Carioca* and *Corcovado* cliffs; *Botafogo*, on a circular inlet enclosed by the Pão d'Assucar and other granite heights. Farther on the chain of suburbs is continued along the shore by *Capocabana*, and south of *Corcovado* by various other quarters stretching beyond the *Rodrigues de Freitas* lagoon to the *Botanic Garden* and to *Gavia*. Northwards the semi-circular *S. Christovão Bay* is skirted by a large quarter grouped round the former imperial palace; westwards, beyond the vast public grounds of *Largo da Republica*, follow other serpentine suburbs all the way to the brooks descending from the valleys of the *Tijuca* mountains. Altogether from *Gavia* on the Atlantic to *Caju* on the bay, or to *Cascadura* in the interior, the distance in a straight line is no less than 17 miles, and even beyond these points other suburban groups are springing up in various directions.

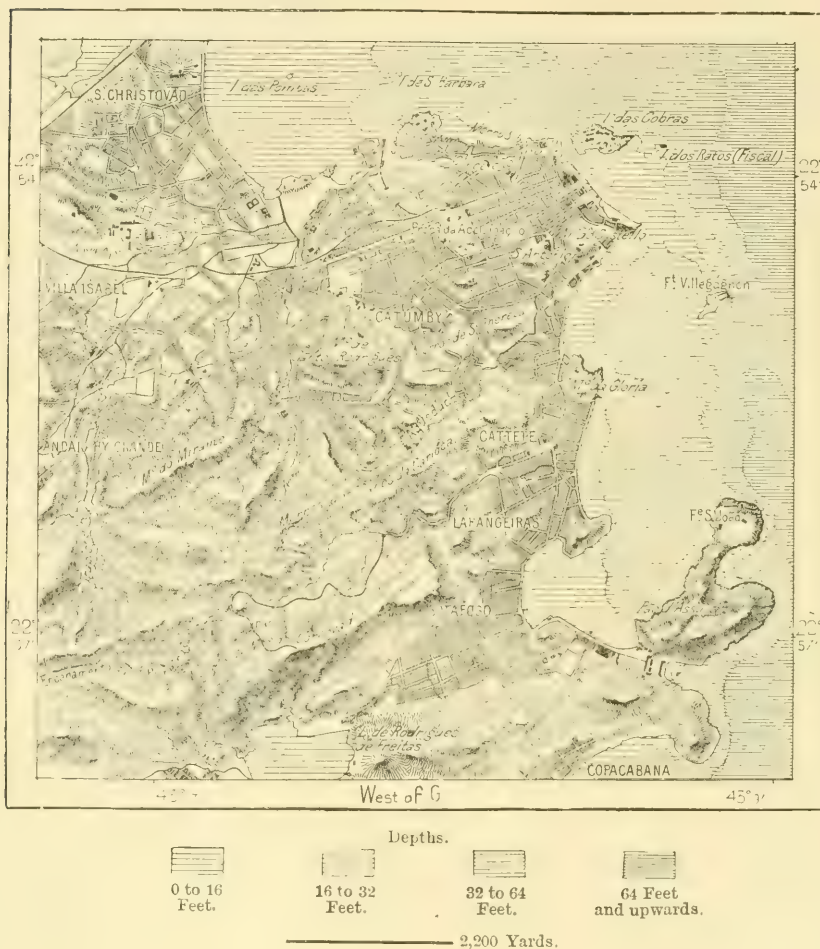
Nitheroy also has spread like the metropolis along the shores of the bay and

up the surrounding valleys. Here are the suburbs of *Icarahy*, *Jurujuba*, and *S. Lourenço*, the last-named originally a native settlement occupied by those Indians who had sided with the Portuguese in their wars with the French.

Despite the vast space which it covers, Rio has a population which, according to the rough returns for 1893, cannot be estimated at more than about half a million. The official census of the municipality for 1890 gave 48,576 houses and

Fig. 79.—RIO DE JANEIRO.

Scale 1 : 90,000.



71,607 families, which, allowing seven persons to the family, would make almost exactly 500,000. But the *Fluminenses*, or "River Folk," as the inhabitants of Rio are familiarly called, often exaggerate the population of their city, and are reluctant to admit that in this respect Buenos Ayres takes the foremost place amongst the cities of South America. They speak in an off-hand way of "a million" as about the population of the Brazilian capital, "including the suburbs."

But the mortality is excessive, and but for the constant immigration from the rural districts, and even from remote parts of Brazil, such as Ceara, Pernambuco, and Bahia, as well as from Europe, Rio would gradually be depopulated. In this

Fig. 80.—RIO DE JANEIRO BAY.

Scale 1 : 320,000.



movement the Italians and the Portuguese form the majority of the labouring and retail trading classes, while the liberal professions are chiefly represented by the English, North Americans, French, Germans, and Swiss.

The free circulation of the air is prevented by the screen of mountains inter-

vening between the city and the Atlantic. Most of the streets are also badly paved and worse drained; hence in recent years Rio has suffered much from epidemics, especially yellow fever, which would appear to have even become endemic. Water, however, flows abundantly in all quarters, being supplied in the proportion of about 40 gallons daily per head of the population. Rio no longer depends as formerly on the Carioca springs alone, which rise in the hills north of Corcovado, and the water from which is conveyed by conduits and a fine aqueduct to the central districts. In the surrounding forests, which have become State property, reservoirs have been constructed at intervals along the course of several underground channels. Such is that of *Pedregulho* near S. Christovão, which is fed by the Rio de Ouro 30 miles to the north, and which has a capacity of about 9,000,000 gallons.

Rio is far from a monumental city. The churches are copies of copies in the usual Jesuit style, while with few exceptions the recent public buildings resemble huge barracks. On the other hand few cities are adorned with more beautiful avenues, such as those of la Tijuca, and the triple avenue of lofty palms (*Oreodoxa oleracea*) in the Botanical Gardens. These palms have a perfectly smooth, slender stem about 80 feet high, terminating in a mass of leaves each averaging 10 or 12 feet in length.

Although there are no special industries, Rio has to some extent become a manufacturing city, with numerous cotton-spinning and weaving mills, foundries, furniture, cabinet, and shipbuilding works. Several docks and repairing basins have been excavated in the live rock of the Saude hills and in Cobras Island near the marine arsenal. Coffee, the staple of the export trade, was shipped to the value of £8,000,000 in 1892, the total exports amounting to about £15,000,000, and the imports to over £16,000,000. In the general movement of the foreign exchanges Great Britain takes the first place, the United States, France, and Germany following in the order named. The traffic with the interior is almost exclusively carried on by means of the two chief lines of railway, one running to S. Paulo, the other to Minas Geraes. The local circulation is amply provided for by numerous tramways, worked either by mules or by electricity, while the communications with Nietheroy and the various towns and ports around the bay are kept up by means of steam ferries. These have preserved their English name of "ferry," while the omnibuses are still known by the name of "bonds," from the bonds originally issued by the English company which introduced this system of locomotion.

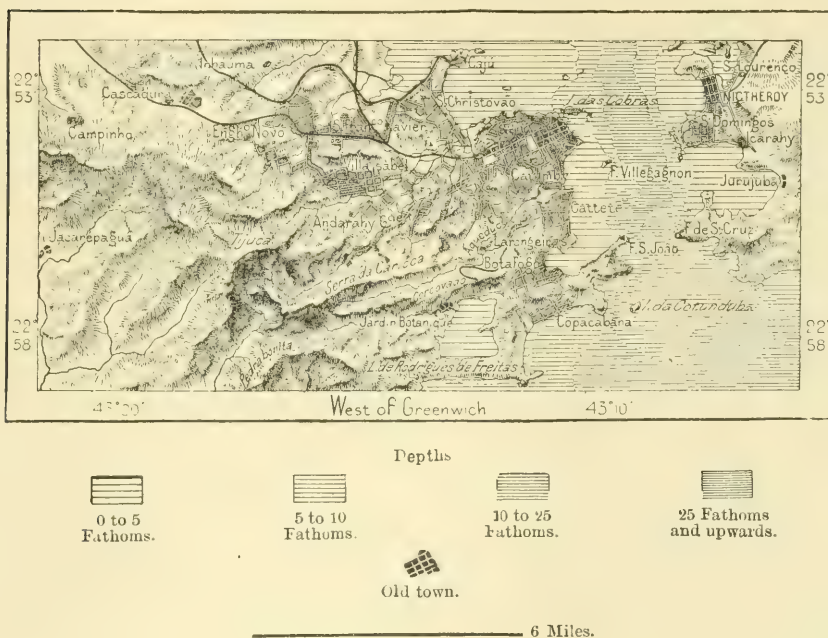
Rio, which has been capital of Brazil since 1763, is the seat of the chief museums and learned institutions of the republic. Amongst these is the School of Medicine, one of the first in the New World, in connection with the vast Misericordia Hospital. This sumptuous establishment, which accommodates 1,200 patients, and which appears to be admirably conducted, stands on the spot where Magellan landed in 1520 on his voyage round the globe. Other important establishments are the Polytechnic School, the Academy of Fine Arts, the Conservatoire of Music, the Blind and Deaf and Dumb Asylums, the School of Navigation,

the Natural History Museum, the Public Library with 200,000 volumes, the Historico-Geographical Institute, and the Geographical Society, both with valuable special libraries. The observatory, at present rising above the picturesque ruins of an old Jesuit Church, is to be removed to a peak of the Serra do Mar near Petropolis, 3,450 feet above sea-level.

Besides the botanic garden, with a domain of no less than 1,500 acres, of which, however, not more than 150 are laid out, there are several other public grounds, all displaying the great variety and splendour of the Brazilian vegetation. Such are the Passeio Publico, on the seashore, the Largo do Constituição, near which are grouped the chief theatres, and the Largo do Republica, between the

Fig. 81.—RIO, NICTHEROY AND ENVIRONMENTS.

Scale 1 : 180,000.



old town and the new quarters stretching westwards. On the beach near the botanic garden it is proposed to lay out a fashionable watering-place under the name of *Gavia*, with a seaward frontage of nearly three miles.

Besides its public grounds, the Brazilian capital offers to sightseers many admirable prospects from the numerous eminences that spring from the very heart of the city like the islands from the waters of the bay. Rio is not like Rome or Byzantium, a "city of seven hills." In fact the heights are not easily enumerated, for certain rising-grounds may be regarded as isolated knolls or as simple headlands, while others, attacked by the quarrymen, are in process of disappearing. These quarries of red or grey granite interspersed with black grains, supply an excellent building material for the public monuments. More than half of the

Morro de S. Diogo, north of the city, has already been levelled, and several heights have been swept away to improve the ventilation, and to fill up some of the swamps and creeks along the shores of the bay.

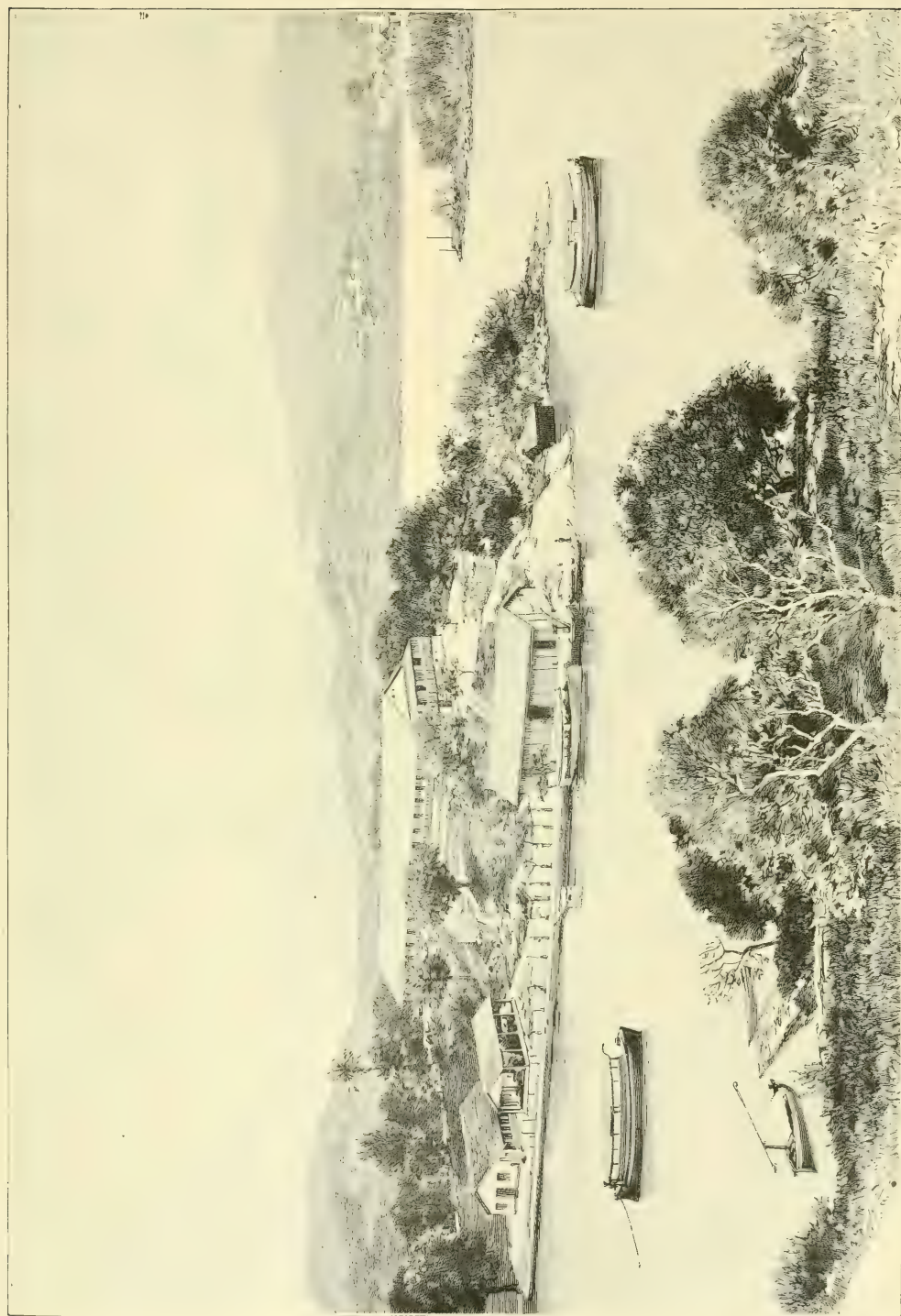
Amongst the improvements already begun, but interrupted by the civil war (1894), is the levelling of the Morro do Senado near the centre of the city, with the refuse of which the Praia Formosa inlet is to be filled in, thus connecting with the mainland the two islands *dos Melões* and *das Moças*, and reclaiming the whole space of about 820 acres with a mean depth of 10 feet, which stretches a distance of nearly three miles from the beach, at Saude, to the headland of Caju. This scheme, when carried out, will afford a vast space for the expansion of the commercial quarter, while the new wharves and the dock, of over 30 acres, will have a mean depth of no less than 30 feet.

It is also proposed to enclose by a semicircular dyke the whole space comprised between Fiscal Island and the military arsenal in the east end, and to level the two morros of Santa Antonio and Do Castello. *Corcovado*, another summit 2,330 feet high, is reached from the suburb of Laranjeiras, by an extremely steep and winding railway two and a half miles long. From this commanding peak in the south-west, a superb panoramic view is afforded of the city with its domes and belfries, the blue waters of the bay studded with shipping, the wooded and rocky islands and the mountains bounding the horizon in the distance. On *Governador*, largest of the islands, have been found numerous human remains, and other objects dating from pre-historic times. Here Estacio de Sá, founder of Rio, fell mortally wounded in a fray with the Indian allies of the French. More to the north-east stretches the charming island of *Paqueta*, covered with gardens and villas. Close to the beach between Nictheroy and *S. Gonçalo*, lies the islet of *Flores*, a sort of labour market, where immigrants are landed and hired by the planters. Nearly 4,000 were recently crowded together in this narrow space, which affords convenient room for little more than a thousand.

Several of the surrounding urban groups must be regarded as mere dependencies of the metropolis. Such are *Santa Cruz*, a station on the Central Railway some 38 miles to the west of Rio, where the shambles have been established, *Jacarepagua* and *Guaratiba*, both in the neutral municipality, the former on a tributary of the Camorim lagoon, the latter on the plains sloping south-west to the Marambaia estuary.

Petropolis, the "Versailles of Rio," lies beyond the neutral territory on the northern slope of the Organ Range, within the Parahyba basin. Originally an agricultural colony, where 2,000 Germans were settled near the imperial residence in 1845, Petropolis has become a great agricultural centre, one of its numerous colleges occupying the imperial chateau itself. Petropolis is also a health resort much frequented by the citizens of Rio, with which it is connected by a fine highway often spoken of as the "Simplon" of America, and by a railway of remarkably steep ascent, crossing the highest crest at an elevation of 2,740 feet.

From the summit of the Corcovado (2,200 feet), in the Petropolis district, a magnificent panoramic view is commanded of one of the most picturesque regions

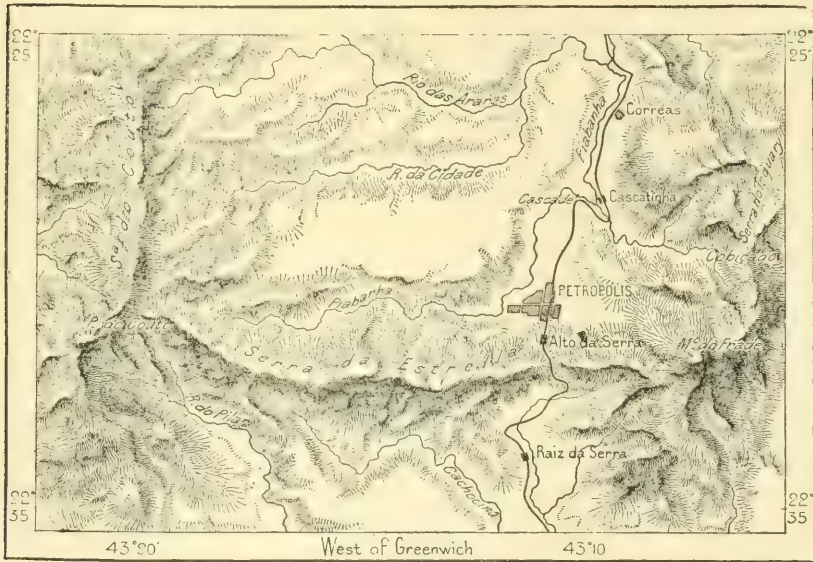


IMMIGRANT STATION, FLORES ISLAND, IN RIO DE JANEIRO BAY.

on the globe. "With a perfectly cloudless sky," writes Mr. Dent, "the eye ranged from the Organ Mountains on the north side, some 50 miles away, to Cape Frio, 75 miles to the east, and to a Cape beyond the Ilha Grande near Paraty, some 70 miles or more to the west; while to the south lay the broad expanse of the Atlantic, whose ripples broke in silver threads upon the sandy shores, or dashed against precipitous rocks. All the mountains on the Nietheroy side appeared a promiscuous mass of dark green hillocks. The whole of the Bay of Rio de Janeiro, with its countless islands, was mapped out. At a dizzy depth below lay the vast city, its numerous morros, or hills, scarcely appearing to rise above the plain. To the west, by glimpses through the rough-and-tumble forest-clad mountains, were lovely scraps of the Atlantic and the Cape in the far distance, on the borders of the province of S. Paulo. The horizon of the Atlantic was lost in

Fig. 82.—PETROPOLIS.

Scale 1 : 300,000.



the haze; but on its blue bosom were seen, as tiny white specks, ships in full sail, and one or two steamers. Just below lay the Botanical Gardens and the dark green slimy waters of the Lagoa Rodriguez de Freitas, contrasting wonderfully with the clear blue of the bay and the Atlantic, from which latter it is separated by a strip of white sandy beach. I could distinctly hear the pleasant jingle of the bells on the tram-car mules some 2,000 feet below, and even the trampling on the hard setts, and could just see the cars crawling along like specks on the long, straight white road."*

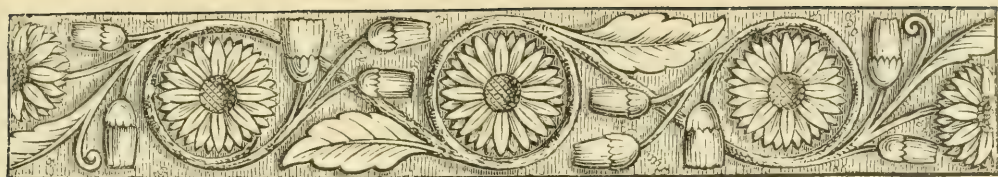
Nova Friburgo, which occupies a position analogous to that of Petropolis on the

* *A Year in Brazil*, p. 209.

northern slope of the serra da Boa Vista, as the coast range is here called, was also originally an agricultural settlement founded in 1819, by 1,700 peasants from the Swiss canton of Friburg. But within a single decade more than a third of these colonists had disappeared, and since the middle of the century this place has been a thoroughly Brazilian town, containing but few of the first Friburg families. From the district Rio draws vegetables, poultry, and other supplies forwarded by the railway to Nictheroy. Although now chosen as the seat of the State legislature, *Therezopolis* is a less important place than either Petropolis or Nova Friburgo. It is still (1894) unconnected by rail with the bay.

Beyond the neutral municipality follow several well-sheltered little havens along the west coast. Such are *Mangaratiba*, ruined by the abolition of slavery; *Angra dos Reis*, dating from 1532, now the quarantine station of Rio, and *Paraty*, farther west, noted for a rum of prime quality.





CHAPTER XI.

PARANA SLOPE AND ADJACENT COASTLANDS.

STATES OF S. PAULO, PARANA, AND SANTA CATHARINA.

THE geographical region draining south-westwards to the Parana presents a remarkable degree of physical uniformity, although divided into several political administrations, and although the zone of the waterparting is unequally distributed between Minas Geraes, Goyaz, and Matto Grosso. The whole territory is the fragment of a plateau disposed in a vast curve between the two parallel lines of the Atlantic coast and the course of the Parana. Northwards it is limited by the Rio Grande, a main branch of the Upper Parana, and towards the south by the upper valley of the Rio Uruguay.

At the south-west corner, in the narrow tract comprised between the converging Parana and Uruguay rivers, the boundary towards Argentina has not yet been determined. But colonisation has scarcely yet been extended to this region, and even in S. Paulo, by far the most populous of the three States, there still exist "unknown lands" of great extent disposed in parallel strips by the Upper Parana affluents.

From the reports of pioneers and adventurers these lands are known to be to a large extent fertile. They seem destined some day to be the home of teeming populations, and their settlement has already been commenced. Every year, every day almost, sees fresh tracts reclaimed from the wilderness.

THE PAOLISTAS.

Amongst all the populations of Brazil, those of S. Paulo are distinguished by their enterprising spirit, so much so that in some respects this region might be regarded as the true centre of Portuguese America. Soon after the discovery the daring pioneer, João Ramalho, in friendly alliance with the Indians, had estab-

lished himself on the inland plateaux far from the sea-coast. So early as 1532 a fortified station was founded at Piratininga ("Dried Fish"), near the spot where was afterwards built the city of S. Paulo. In 1552 the Jesuits arrived and took up their residence in the midst of the Indians, laying the foundations of S. Paulo, which was destined to eclipse the earlier settlement of Santo Andres de Piratininga.

But the inevitable conflict soon broke out between the civil and ecclesiastical elements. The free colonists, eager for wealth, had begun to enslave the natives, employing them either in cultivating the land or in the quest of gold; but the priests, while also utilising their labour, strove at least to protect them from violence and enforced servitude. On the other hand the Jesuits, regardless of political frontiers, continued to work in unison on both sides of the Hispano-Portuguese boundary, and advantage was readily taken of this alliance to charge the missionaries with treason when they tried to prevent or to punish the incursions of the Paulist *bandeirantes* in the Paraguay and Bolivian missions. Hence constant struggles, in which the Jesuits were at last worsted, although often upheld by the central power and always by the authority of the Roman pontiff. Thus a free hand was given to the Paolistas, who, in their slave-hunting raids, crossed rivers and mountains, ranging right up to and even beyond the Amazons to the slopes of the equatorial Andes. Muratori estimates at two millions the number of Indians captured by these predatory bands in the course of three hundred years.

This indomitable energy displayed in their kidnapping expeditions they now apply to more peaceful pursuits, and since the middle of the nineteenth century they have distinguished themselves in this respect beyond all other natives of Brazil. To them more especially the country owes its pre-eminence over all rivals as a coffee-growing land. They also take the foremost position in the industries; their railway system is the most fully developed, and they have even outstripped Minas Geraes and Rio de Janeiro in the preparation of the typographical chart to the scale of $\frac{1}{100,000}$. An expedition appointed to explore one of the great routes destined one day to connect their territory with the Argentine regions, has even drawn, to the scale of $\frac{1}{50,000}$, a map of the whole course of the Rios Itapiranga and Paranapanema.

This map is certainly superior to those of the same category published by Castelnau for the Tapajoz and Araguaya basins, by Halfeld for the Rio S. Francisco valley, and by Liais for that of the Rio das Velhas. And these cartographic labours themselves are but the outward and tangible proof of the profound investigations carried on by numerous explorers and students in every branch of natural history.

THE DISPUTED ZONE.

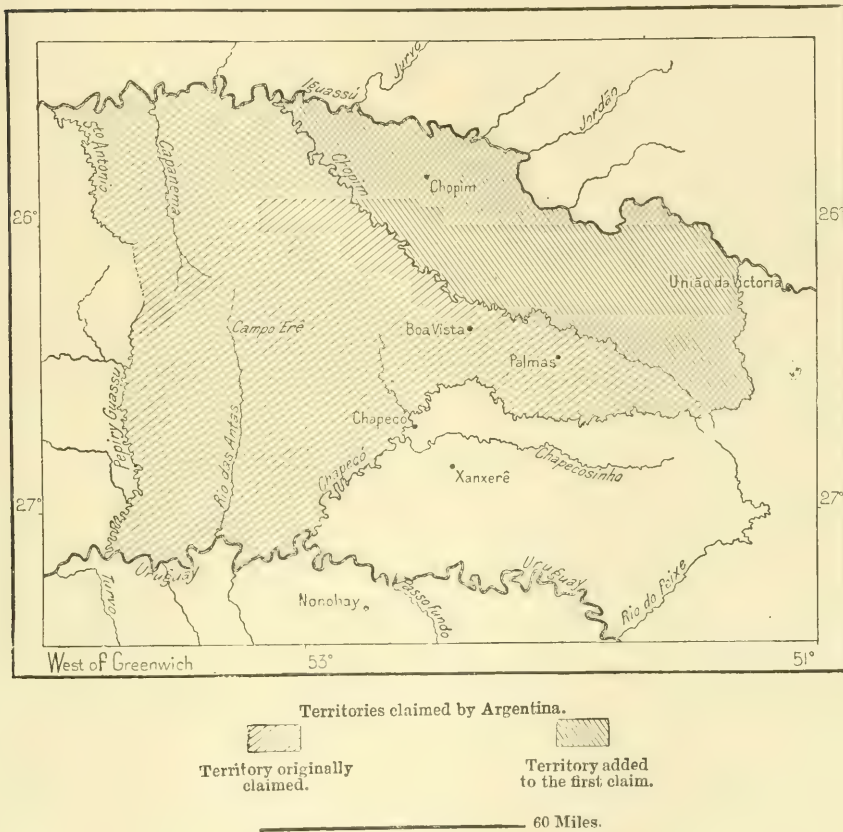
Despite its excellent soil and climate, and its numerous navigable waters, the upper Parana basin is the least known region in this section of the republic.

Since the middle of the nineteenth century railway engineers and other surveyors have traversed the country in all directions, but their itineraries, prepared for special purposes, have contributed little to a general knowledge of the land and of its vast agricultural resources.

S. Paulo represents nearly one-half of the whole region in extent, and its population is greatly superior to that of the two other States together.* Santa Catharina, smallest of the three, threatens to be still further reduced by the loss

Fig. 83.—CONTESTED BRAZIL-ARGENTINE TERRITORY.

Scale 1 : 3,000,000.



of the south-western district, which is the territory claimed from Brazil by Argentina. This debatable land remains unsettled and almost abandoned since the Spanish-speaking settlers are advancing into the interior by the route of the lower Parana, and the Portuguese by that of the seaboard.

After the first treaty of 1750, a mixed commission was appointed to fix the common frontier; but its work was never finished, and in 1777 it was decided by the treaty of S. Ildefonso that the boundary should follow the waterparting

* Area of S. Paulo: 112,000 square miles; of Parana and Santa Catharina, 113,000 square miles; respective populations, 1,386,000 and 423,000.

between the sources of the Pipiry Guazu affluent of the Uruguay on one and side of the San Antonio affluent of the Iguazu on the other, and should "cover the settlements and missions of Spain and Portugal." But the commissioners were unable to identify these rivers, and after eighteen years of futile attempts to come to an understanding they ceased to act. Since then Paraguay, one of the heirs of the Spanish claims, has been excluded by force of arms, and the issues have been narrowed down to the pretensions of Argentina and Brazil. In 1887 the question was referred to the President of the United States, who, however, has to decide in favour of one or the other of the litigants absolutely, without the option of awarding to each a share of the disputed territory, which has a total area of about 12,000 square miles, with a scattered population (1890) of 2,000 stockbreeders owning 40,000 head of cattle.

PHYSICAL FEATURES.

South of Rio de Janeiro the Coast Range ceases to present the aspect of a mountain chain, at least beyond the Bocaina Mass. After ascending the seaward slope and the slight prominence forming the scarp of the plateau, the traveller advancing from Santos finds himself on a rolling plain with no apparent limits except distant ridges of low elevation. The character of the vegetation also changes abruptly from the tall and leafy trees of the tropical zone to stunted growths, in many places recalling the heaths of North Germany, and on the terraces to groups of fine araucarias growing somewhat wide apart and giving free play to the sunlight.

Although the border ridges are continued regularly along the sea-coast, the different sections take various names, generally from the towns or villages at their foot. Above the port of Ubatuba they are known as the Serra de Ubatuba; between Santos and S. Paulo as the Serra de Cubatão, from a hamlet lost in the marshy bush on a creek enclosing the island of Santos. Seen from the coast the crests seem to run at a somewhat uniform altitude of about 3,000 feet, and consist of gneiss and granite pierced by eruptive masses of melaphyre. In the Serra dos Itatins between Santos and Iguapé the range would seem to rise to 4,370 feet; farther on the Serra de Guarahu presents the same elevation, and in the State of Parana the Serra Graciosa rises, according to D'Orville Derby, to 5,000 feet. The Serra do Mar is crossed by the railway from Santos to S. Paulo at an altitude of 2,620 feet, while the line between Paranagua and Curitiba pierces the crest through a tunnel 3,130 feet high.

In the State of Santa Catharina the system is interrupted by the broad valley of the Rio Itajahy, beyond which it develops the superb terraces known as the Campos de Boa Vista, and the picturesque granite hills of Tubarao. Here paleozoic limestones and sandstones abut on the crystalline rocks of the Coast Range, and vast stalactite caves traversed by running waters occur in many places. But the goldfields, profitably worked during the last century, have been abandoned.

In S. Paulo, as in Rio de Janeiro, the Serra Mantiqueira still runs parallel with the Serra do Mar, but nowhere presents any great elevations. Beyond Itatiaya it falls over 3,000 feet, although north of Pindamonhangaba the vast plateau of Campos do Jordão is dominated by crests and peaks ranging from 5,000 to 6,000 feet. In the Moro do Lopo, on the borders of Minas Geraes, the chain, here 5,450 feet high, broadens out, and throws off numerous spurs in the

Fig. 84.—GROUP OF ARAUCARIAS—STATE OF S. PAULO.



direction of the north. The heights near Poços de Caldas (5,200 feet?) are of the same formation as Itatiaya—granites and gneiss associated with phonoliths and tuffas giving evidence of former volcanic eruptions.

North of the capital the Serra Mantiqueira takes the name of Cantareira, and beyond the pass where it is crossed by the northern railway it becomes the Sierra de Jaragua from a conspicuous peak 3,600 feet high. Beyond the broad and deep valley of the Rio Tieté it merges on one side in the inland plateaux, on the

other in the Serra do Mar system. On the outer slopes the érupted rocks have, for the most part, been transformed to the famous *terra roxa*, "red earth," which yields such magnificent crops to the coffee growers. In some places this formation has a thickness of 60, 100, and even 220 feet. The colour is of a duller red than that of the *terra vermelha* or *massapé*, which occurs in many other parts of Brazil, and which is derived from the disintegrated granites of those regions. Agriculturists thoroughly understand the different shades of colour in all these lands, the market price of which is, in fact, determined by the particular hue of the soil.

On the Parana slope many of the uplands are sufficiently level to take the name of campos—broad expanses under grasses or low plants contrasting with the primeval forests and *capoeiras* or thickets of second growth. Although the campos have been enlarged by conflagrations, they do not appear, as many assert, to owe their existence exclusively to the action of fire. These treeless regions certainly receive a sufficient rainfall to nourish an arborescent vegetation, for the trees now and then planted by the half-nomad settlers readily take root and flourish without artificial irrigation.

RIVERS—COAST STREAMS.

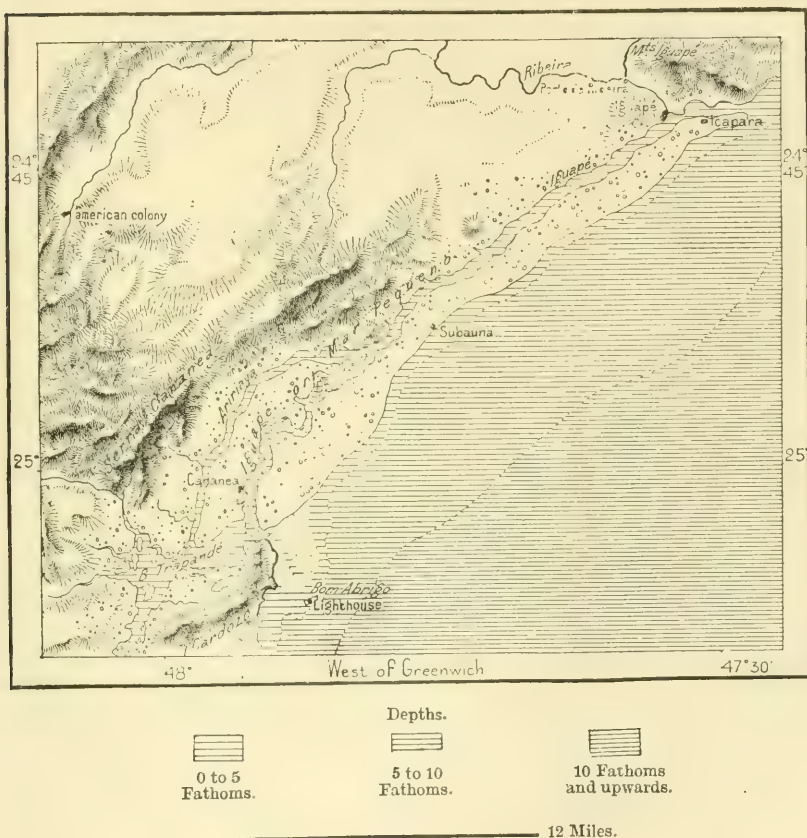
On the seaboard between the States of Rio de Janeiro and Rio Grande do Sul the chief watercourse is the Ribeira de Iguapé, whose headstreams, rising on the inland plateaux, pierce the Serra do Mar through deep gorges. In its lower course the Iguapé flows close to the coast, and even throws off a branch three miles long which joins the Cananea inlet. But the mainstream trends north-eastwards to the coast at a point where the sea is open and free from reefs. Small steamers ascend the Lower Iguapé and even its two affluents, the Juquia and the Jacupiranga. In Santa Catharina the chief river is the Itajahy, which traverses the German settlements, and is thus better known although inferior in size and volume to the Iguapé, whose catchment basin probably exceeds 11,000 square miles.

The Serra-abaixo, "Piedmont," or narrow strip of coastlands between the Serra do Mar and the Atlantic, has been entirely formed by marine deposits. In the sandstones covered with shifting dunes are embedded stems and roots bearing a great resemblance to the present magnolia trees. These deposits have certainly been covered by the ocean within a comparatively recent period, and several successive movements of upheaval and subsidence would appear to have taken place. The cliffs containing vegetable remains reveal eight or ten distinct strata of varying thickness, all disposed horizontally. One of these strata, consisting of a nearly pure limonite iron ore, has been formed in marshy waters. According to Karl Rath the whole of the South Brazilian coast between Rio de Janeiro and Rio Grande do Sul is at present rising. The old Indian graves, and the tambaqui or shell-mounds occurring in large numbers along the beach, all stand at a height of 40 to 80 or 90 feet above high water, although they must have been originally deposited at sea-level.

Along the whole of the southern seaboard beyond Santos frequent modifications have evidently taken place in the contour line of the coastlands. On the one hand, the sea has penetrated through creeks and inlets into the mainland; on the other the mainland has advanced seawards, developing mud banks, sandy spits, and cordons along the beach. In the north the coast of S. Paulo has been carved into rocky headlands and islands, plunging their steep escarpments into deep water, or rising, like the large island of S. Sebastião, 4,300 feet above the

Fig. 85.—CANANEA CHANNEL.

Scale 1 : 700,000.



surface ; but farther south is seen the opposite phenomenon of sandy formations fringing the shore. Some rocky islands have thus been joined to the mainland by recent alluvial deposits filling up the intervening channels. Such are the Santos and Santo Amaro hills, where the old marine straits are now represented only by shallow backwaters.

The vast Bay of Paranaguá, which greatly resembles that of Rio de Janeiro, is bordered, like the Santos inlet, by marshy tracts standing little above sea-level. Farther south the large island of S. Francisco at the Joinville estuary has preserved its insular character, being still separated from the mainland by an open

channel, although its outer margin facing seawards coincides exactly with the normal coast-line. Similar conditions are presented by the granite island of Santa

Fig. 86.—S. SEBASTIÃO AND ITS ISLAND.

Scale 1 : 500,000.



Catharina, which an upheaval of eight or ten feet would suffice to connect with the mainland by a narrow stem projecting between the northern and southern inlets.

PARANA HYDROGRAPHIC SYSTEM.

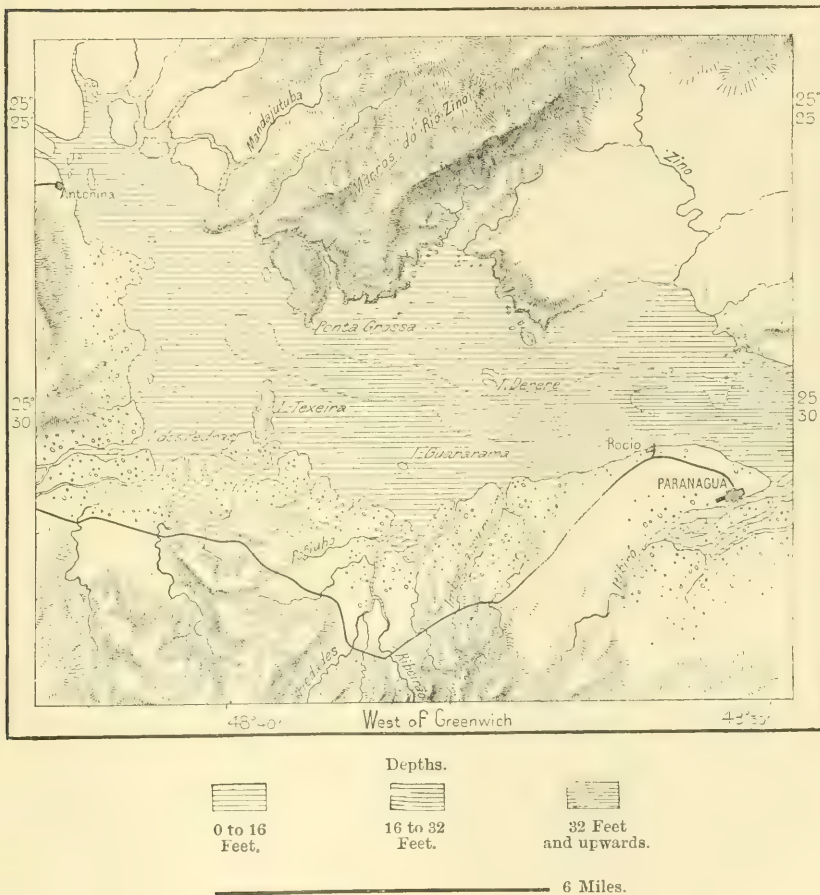
To the somewhat precipitous slope facing the Atlantic corresponds the long gentle incline stretching inland towards the Rio Parana. One section of this

inner slope has even a northerly dip, and in this direction flow several of the large rivers in S. Paulo, such as the Tieté and the Mogy Guassu. But their course is everywhere intercepted by the heights of the central watershed and deflected south and south-west to the Parana.

In the volume of its waters the Rio de la Plata hydrographic system belongs far more to Brazil than to the republics of Argentina and Paraguay. Although

Fig. 87.—PARANAGUA BAY.

Scale 1 : 230,000.



it is not disposed in the direction of the main fluvial axis, the Brazilian Parana receives the most numerous and the most copious affluents from the watershed near the Atlantic, and has a much longer course than the Paraguay branch. In this respect the Parana occupies a position in the Plate system analogous to that of the Missouri in the Mississippi basin.

Of the numerous headwaters of the Parana the most important are the Corumba, the San Marcos or the Paranahyba, but it would be difficult to say which of these has the best claim to be regarded as the main branch. The Parana-

hyba rises at the point farthest removed from the fluvial axis, and at first flows due north in the direction of the S. Francisco. But while still a small stream it bends round north-west and west to the junction with the San Marcos descending from the north.

Some 125 miles lower down the mainstream is joined by the copious Corumba, issuing from the rocky gorges of the Pyreneos Mountains, and farther on by Meia Ponte and the Rio dos Bois descending from the same watershed. From the opposite side comes the Rio das Velhas with the contributions of the Canastra and Matta de Corda uplands. At the confluence of the Rio Grande, which rises on the Minas Geraes plateaux, the mainstream takes the name of Parana, that is "River," in a pre-eminent sense, which it retains for the rest of its course to the Plate estuary.

The Rio Grande is distinguished from all the other branches both by its greater volume, and by the rugged character of its upper basin. Its chief head-stream rises in the Itatiaya group over 8,200 feet above sea-level, and although it is joined by several large streams, such as the Rio das Mortes and the Sapucahy from the north, and the Rio Pardo from the S. Paulo uplands, its upper course is too steep to be navigable except for short stretches. Here it is interrupted by several grand waterfalls, such as the Maribondo Cascade below the Pardo confluence with a drop of about 65 feet. Other cataracts have been gradually obliterated by the erosion of the reefs which obstructed the current. Thus south of Uberaba all the schistose masses, by which the river was formerly blocked, have been eaten away piecemeal. Nothing now remains of these barriers except some fragments of solid quartz, which form rocky islets in mid-stream. At one point these islets have served as the foundations of a bridge, which the engineers have built across the Rio Grande, and the twenty-five piers of which all stand on these natural supports.

Both the Pardo and its Mogy Guassu affluent, as well as the Tieté, flowing more to the south, parallel with the Rio Grande, all present long stretches of navigable waterways, thanks to their more gentle incline and to the works that have been carried out to regulate their course. The Mogy Guassu, which winds through the most flourishing coffee plantations in S. Paulo, has a continuous navigable channel of 140 miles, scarcely interrupted by a few rapids which have been improved by lateral weirs.

Of all the Parana affluents the Tieté has its sources nearest to the Atlantic, some of its headstreams rising within seven or eight miles of the coast, but over 3,000 feet above the sea. Being connected by rail with the port of Santos, its valley, like that of the Mogy Guassu, give access to the till recently deserted regions of the Campos of the Parana. Its lower course, however, is obstructed by the Avanhandava and Itapura falls, respectively 44 and 65 feet high. A few miles below the Tieté confluence, the Parana itself develops the great Urubupunga ("Vulture") falls.

Below the Tieté follow other large tributaries, such as the Sucuryu, Rio Verde, Ivinheima, and Paranapanema, the last-mentioned being nearly as copious

as the Rio Grande. About half of the Paranapanema basin, comprising some 30,000 square miles, still figures on the maps as the *Zona desconhecida*, the "Unknown Zone."

The Paranapanema, or "Useless River," as the word is interpreted by some etymologists, fully deserves its name, so completely obstructed is its channel by projecting reefs and rapids. At the present limit of navigation below the Rio Pardo, occurs the Salt Grande, "Great Fall," where a volume of about 1,000 cubic feet per second is precipitated some 30 feet down to a seething chasm,

Fig. 88.—FALLS OF THE PARANAPANEMA ABOVE AND BELOW S. SEBASTIÃO.

Scale 1 : 750,000.



whence the boiling waters escape through a narrow cleft in the rocks. Other cascades follow, preventing all navigation down to the Tilbagy confluence, whence the channel is free to its junction with the Parana, 850 feet above sea level.

Parallel with the Paranapanema, flow the Ivahy and Piquiry, joining the great artery on the plateau above the point where it forces its way through the Maracaju (Mbaracayu) ridge on the Paraguay frontier down to the plains.

Above this point the Parana expands to a broad lake with two branches enclosing a large island, beyond which it tumbles over several falls from 50 to 60 feet high, all differing in the character of their rocks and vegetation, as well as in the volume of water precipitated. The *Sete Quedas*, or "Seven Falls," as this group is popularly called, must not be taken in the literal sense, for the stream ramifies in the dry season at times into as many as twenty partial currents, while during the floods all merge in a single liquid mass. In 1631, when the Jesuits had to abandon their missions of la Guayra they lost in these waters over 300 boats, and since then the *Sete Quedas* have been known by the alternative name of the Guayra Falls.

Below this point the Parana, after gliding over a few more rapids, gradually enters on its tranquil course, and is here joined by its last great affluent formerly called the Rio Grande de Curitiba, now better known by its Guarani name Iguazu (Y-guassu). Like the parallel rios, Paranapanema and Tieté, the Iguazu is interrupted by a succession of cascades, terminating at the Victoria Falls with an extreme drop of 140 feet. At this point the Brazilian Government has established its military colony and arsenal, commanding the navigation of the whole course of the Lower Parana as far as the Argentine waters. The famous Conquistador Alvar Nuñez had followed this route on his daring journey from Brazil to Paraguay in 1542.

Beyond the Iguazu confluence, the Parana, henceforth free from cataracts or dangerous rapids, passes through several narrow gorges, such as that of Itanguaymi, where the stream, 4,000 or 5,000 yards broad in some places, contracts to scarcely 460 feet. Lower down the river maintains everywhere a great width, rolling down a vast body of yellowish water studded with low islands and lined by marshy banks. At the Paraguay confluence its volume is often ten times greater than that of the rival stream.

CLIMATE.

In a general way the climate of the region resembles that of Minas Geraes, with the essential difference that, lying partly beyond the tropical zone, it enjoys a greater diversity of seasons. Here the winters are real winters, characterised by a marked fall of the temperature, by cold polar winds, and at times even by snow.

But the chief contrast is less between north and south than between east and west, as determined by the varying altitudes. The littoral zone at the foot of the coast range still belongs partly to the torrid region, and merges southwards in subtropical lands resembling Italy both in their climate and their verdant seaward slopes.

Another parallel zone is that of the "Serra," or "Mountain," marked by a lower temperature, but still under the influence of the moist sea breezes. This is followed by the inner and much broader zone of the Campos, presenting the normal conditions of a continental climate with its great range of temperatures, in some years exceeding 60° or 70° Fahr.



VICTORIA FALLS, ON THE RIO IGUAZU.

On the Campos, which are gradually being brought under cultivation, frosts are much dreaded, especially when cold nights are followed by sultry days, when the glass rises to, and even above, 86° Fahr. Frosts follow, especially after heavy rains, when radiation is stimulated by clear, cloudless skies. The rainfall itself is very unequally distributed, rising in some years from nearly 120 inches at Santos to over 160 on the crests of the neighbouring mountains, and then falling to less than 40 at S. Paulo on the landward slope. On the other hand, the aërial currents generally maintain their normal direction throughout the year. A regular diurnal alteration takes place between the south-east marine, and the north-west land breezes, the former prevailing during the night and early morning, the latter in the evening.

Thus S. Paulo, although standing on the inland plateau, enjoys a semi-marine climate; but a few miles farther on the conditions are entirely changed.* The line of equal magnetic declination traverses the State of S. Paulo with a gradual incline towards the west. In 1885 it had reached the seaboard above Iguapé a short distance to the west of Santos.

FLORA AND FAUNA.

During the winter months (June, July and August) the bare trunks of the trees, the withered herbage and the absence of flowers, impart a dreary aspect to the landscape. But with the first rains nature is transformed, and, as if by enchantment, the plains are covered with the green sprouts of young plants, and even with brilliant corollas. According to the seasons different groups of flowers burst into bloom, blue, yellow or red tints predominating each in its turn.

Loefgren estimates at 2,000 the number of plant forms growing on the Campos of S. Paulo. Here the *araucaria paranensis* is one of the characteristic forest trees, abounding especially in the more temperate zone. In general, the tropical selva is intermingled with the herbaceous vegetation of the Plate region, the former prevailing especially on the seaboard, and along the valleys of the streams flowing to the Parana; but here great clearances have already been made by the planters, the soil of the forest tracts being found the most favourable also for the coffee shrub.

But in many districts the woodlands have been cleared too rapidly. Much ground, carelessly prepared for tillage, has had to be abandoned after a preliminary attempt at cultivation, and new forests, consisting of different species, take the place of the primitive selva. Such tracts, locally called *Capoeiras*, are less beautiful, less picturesque than the virgin forest, and at the same time more difficult to traverse. These thickets, with their tangle of thorny bushes and

* Meteorological conditions in the Parana States:—

	Lat.	Altitude.	Mean Temp.	Rainfall.	Rainy Days.
City of S. Paulo	$23^{\circ} 35'$	2,460 feet.	65° Fahr.	55 inches	152
Campinas . .	$22^{\circ} 58'$	2,170 "	68° "	60 "	171
Itapetininga .	$23^{\circ} 35'$	2,120 "	64° "	54 "	?
Blumenau . .	$26^{\circ} 55'$	164 "	70° "	44 "	113

other undergrowths, are, in fact, accessible only to the tapir and the hunter familiar with the practicable tracks.

The herbaceous vegetation of the Campos differs little in its general aspect from that of the Argentine pampas. Here also the plains are dotted over with clumps of low trees, which shed their leaves during the dry season. But vast spaces are entirely treeless, either owing to the periodical conflagrations, or because arborescent vegetation is prevented from striking root by the dense growth of herbaceous plants. These plants themselves, however, present a great variety of forms, resembling in their main features those of the pampas, and even of the Andean punas.

Similar contrasts are offered by the local fauna. Monkeys, coatis, capyvaras, sloths, ant-eaters, and tapirs are still met in S. Paulo and Parana; turtles and crocodiles also frequent the streams; while the flowery plains are enlivened by gaudy butterflies and humming-birds of resplendent plumage. The ñandu, or plateau ostrich, which has disappeared from North Brazil, is still found in somewhat numerous flocks on the Parana campos. But he cannot hope long to escape from the pursuit of the sportsman with his deadly rifle and swift hound. The American ostrich must soon become a mythical bird like so many other species that have already disappeared. It will become associated with the other monstrous forms created by the popular fancy, or exaggerated by vague tradition. Thus, according to the unanimous testimony of the natives, the region of the water-parting between the sources of the Parana and of the Uruguay, was formerly, and perhaps still is, infested by a "worm" of huge proportions, strong enough to uproot the trees on the marshy ground. The legend has reference perhaps to some extinct anaconda of exceptional size, and may be regarded as a lingering reminiscence of the serpent-worship which lies at the origin of so many religious systems.

Mr. Wells tells us that certain marshy districts called *burityzals* are still the haunts of enormous anacondas, of such a size that he hesitates to give their exact length for fear of being charged with exaggeration. He adds, however, that they are "certainly longer than I have ever heard of any species of snake in any part of the globe." He was assured by the natives that cattle wading into the swamps to drink water are often swallowed by the monsters, all but the head and horns, and he seems to give some credence to the statement.*

INHABITANTS.

Pre-historic remains abound on the seaboard, where hundreds of shell-mounds are met, containing, like those of Europe, chipped stones and other objects of primitive industry. In these *tambaqui*, vulgarly pronounced *sambaqui*, have also been found skeletons belonging to very different types, usually seated and associated with vases, ornaments, weapons, and utensils, the implements being mostly of basalt, but also of porphyry, quartz, and meteoric iron.

* *Three Thousand Miles Through Brazil*, vol. II. p. 167.

The shell-mounds certainly date from a remote epoch, for several have disappeared beneath the detritus washed down by ancient streams, while large trees of the primeval forest have struck root in others. Some represent a prodigious amount of labour, being over 300 feet wide and 50 feet high. For two or three hundred years they have furnished the lime-burners with sufficient materials to supply Rio Santos and many other towns with lime, yet a considerable number still remain.

On the plateaux are also seen numerous sepulchral mounds, which are known in the country by the appropriate name of *sepulturas velhas*, "old burial grounds." It is noteworthy that the earth used in the construction of these barrows is always different from that of the surrounding soil. Some are built of stones, in which case the materials have also been brought from a distance, as if some religious idea were associated with the increased labour thus involved.

From the form of most of the skulls found in the old graves it may be inferred that the pre-historic aborigines belonged to the same race as the contemporary Tupi and Guarani peoples. Nevertheless, Lofgren found in a tambaqui six miles west of S. Vicente a skull analogous to those brought to light by Lund in the Lagoa Santa caves.

When the first Europeans arrived, the dominant Tamoyos were very powerful, and took the lead in a general alliance of all the coast tribes against the Portuguese. These would, in fact, have probably been exterminated but for the intervention of the Jesuits, Nobrega and Anchieta, who induced the warlike Indians to make peace at a critical juncture.

The other natives of the coastlands—Goyanazes, Itatins, Piturunas, Guanhanari, Carijos—have all been merged in the general population, which is now rapidly mingling with the most diverse elements. The Italians arrive in great numbers in S. Paulo, and in many rural districts are already in the majority. With them come other Europeans, besides gypsies, eastern Jews, and Maronites from Syria. In general, the Paulist type has the reputation of being the finest in Brazil. According to a local saying, we are asked to admire, in Bahia, the *he's*, not the *she's*; in Pernambuco, the *she's*, not the *he's*; in S. Paulo, the *she's* and the *he's*.

Being broken into scattered groups, the aborigines of the Parana States no longer possess any kind of solidarity in their struggles against the whites, and are thus destroyed in detail. Those grouped round the Jesuit mission of La Guayra were the first to disappear, whole communities of peaceful neophytes being dispersed or led captive during the ten years ending 1638. The Jesuits themselves had to take flight, and in 1641 Montoya attempted to remove the survivors to the district at present known as the "Missions" on the banks of the Lower Parana. But in the exodus more than half of his faithful adherents perished, and after all the massacres, hardships, and disasters in the river only 12,000 remained of those once flourishing congregations.

Of late years a certain counter-movement has set in amongst the indigenous populations. Being arrested or driven back by the rising flood of Argentine

colonisation, some of the Guarani Indians, who had come originally from the south, have retraced their steps in the direction of the Upper Parana. A few families, immigrants from Paraguay, now dwell in the western forests of the State of S. Paulo, and these do good service as boatmen in forwarding merchandise by the water highway. But they nowhere group themselves in villages under the control of the whites, and they also keep aloof from the surrounding aborigines.

The aborigines, who continued to lead a savage existence in the forests and on the campos, collectively called Bugres by the Brazilians, belong to three distinct families: Chavantes, Cayuas or Cayovas, and Coroados. It is uncertain whether the Chavantes are of the same stock as those bearing the same name on the banks of the Araguaya and Tocantins. Their Coroado neighbours call them Cucurton, that is, "Unclothed." They are noted for their repulsive features and nearly black colour, and lead a wretched existence, without huts or tents, cultivating no land, and living on roots, fruits, lizards, and rats. During the dry season they fire the savannas, and kill with branches all the small animals that try to escape the conflagrations. They pass whole days digging for the honey of a little burrowing bee, using for the purpose the scraps of iron they steal from the settlers.

In S. Paulo and Parana the Paranapanema basin is partly occupied by about 3,000 Cayuas, who are certainly of Tupi origin, their Abanheenga language differing little from the *lingua geral*. Several members of the tribe are now associated with the whites, and take part in the field operations; but they have the reputation of being extremely sensitive, so that the colonists have to be constantly on their guard to avoid giving them offence.

The Cayuas are expert boatmen and daring swimmers, and display great skill in shooting the rapids. They weave excellent robes or blankets with nettle fibre, make good earthenware, and cultivate a variety of maize unknown to the whites. They reckon by sevens, and still wear the *tembeta* or *cherimbita*, a stick of resin introduced into the lower lip, and looking like a long thorn. Similar ornaments of transparent quartz or other hard material are used in various other parts of Brazil, and the practice was formerly far more general, perhaps universal, amongst the populations of the whole region between the Amazons and the Parana.

To the third indigenous group of S. Paulo the Brazilians apply the name of Coroados, "Crowned"; but these Coroados are of different stock from other tribes similarly designated, such as those who formerly occupied the State of Santa Catharina, and who have left Tupi names to all the rivers of that region. The term has reference merely to the common fashion of wearing the hair in form of a crown round a tonsure on top of the head.

The Paranapanema Coroados are a thick-set, vigorous race, with broad shoulders, large head, powerful jaws, and small eyes. In fact, they present a type somewhat analogous to that of the Asiatic Mongols, whereas most of the Tupis have the eagle-like physiognomy of the North-American Redskins.

Neither the Cayuás nor the Chavantes understand the language of the Coroados, who have been credited with a symbolic system of representation, which the whites are unable to interpret, and which will probably have perished before any attempt can be made to decipher the symbols.

The traveller crossing the woodlands enclosed on all four sides by the rivers Paranapanema, Parana, Ivahy, and Tibagy, often meets in the vicinity of abandoned huts coils of creeping plants suspended across the path intentionally and decorated with bits of wood, feathers, bones, birds' talons, the jaws of monkeys or of wild boars, and similar strange objects. From their peculiar arrangement it seems evident that the whole series forms a sort of historic record, a statement or message addressed for some purpose to allied or kindred tribes, and intelligible to them.

Occasionally the Coroados make use of this mysterious method of composition to threaten the whites. Arms planted in the ground, wings of the aras, like those with which they feather their arrows, are symbols, the sense of which can scarcely be misunderstood. They are certainly more significant than the strange markings which from time to time appear on the mangoes and other trees over wide tracts in India, and which raise periodical scares amongst the white rulers of the land.

TOPOGRAPHY—TOWNS OF SOUTH MINAS.

Since the introduction of railways new directions have been given to the current of migration. Thanks to the facilities afforded by this means of communication, the populations of the Upper S. Francisco, and of the chief towns, such as Ouro Preto, Sabara, and Pitanguy, have begun to gravitate in the direction of Rio de Janeiro, despite the natural slope of the land, which should constitute Bahia the centre of attraction. Still more powerfully drawn towards Rio and S. Paulo are the mineral towns of the south-east in the Parahyba basin, and those of the south-western districts traversed by the head-waters of the Parana. Several of these places have already acquired some importance as secondary centres of trade and industry. In these respects they have even outstripped the city of Ouro Preto, which still retains the rank of capital, but which is situated in a narrow valley draining to the Rio Doce, and standing apart from the main highways of communication.

On the Parahyba slope, within the Minas frontier, the chief place is *Juiz de Fora*, which stands about 2,300 feet above the sea on the right bank of the Parahybuna affluent. Here is the seat of a flourishing German colony, and since the opening of the central railway and of the carriage-road to Petropolis, Juiz de Fora has become an industrial town, and the most active agricultural centre in Minas Geraes. It now aspires to succeed Ouro Preto as the future capital of the State.

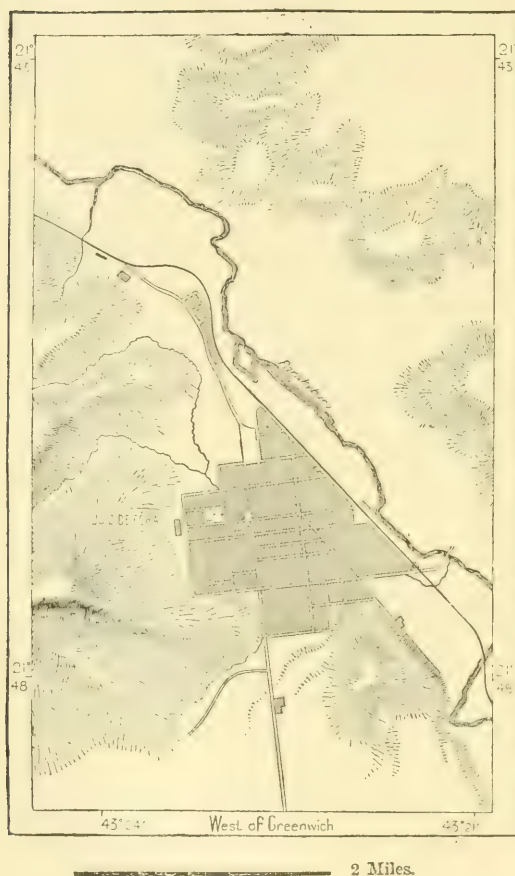
In the same basin follow other thriving settlements, such as *Parahybuna*, on the river of like name, at the foot of the superb Fortaleza bluff; *Mar de Hespanha*,

in the midst of coffee plantations, on a terrace stretching north of the Rio Parahyba; *Leopoldina*, which has given its name to an extensive system of railways, with terminus at Nietheroy, on the bay of Rio de Janeiro, and with numerous branches ramifying through Espirito Santo and Minas Geraes; *Uba*, also in a coffee-growing district on the southern slopes of the Serra de S. Geraldo, which is crossed by a winding railway at an altitude of 2,400 feet.

On the Parana slope of Minas Geraes *Barbacena* occupies a position analogous

Fig. 89.—JUIZ DE FORA.

Scale 1: 90,000.



to that of Juiz de Fora on the Parahyba slope. Standing at an elevation of 3,680 feet near the central divide of Brazil, it commands the watersheds of the four great rivers, Parahyba do Sul, Rio Doce, S. Francisco, and Parana. Barbacena may thus be regarded as the central city of Brazil, and it accordingly claims like Juiz de Fora to be chosen as the State capital. It presents a pleasant appearance, spread out in amphitheatrical form on the crest of a long ridge planted with bananas and orange groves. Several of the surrounding valleys are frequented as health resorts by the people of Rio de Janeiro during the hot season.

On the neighbouring heights rises the Rio das Mortes, whose name recalls the sanguinary conflicts of former times between the Paulistas and the gold-hunters of other provinces. This river flows westwards in a valley where are situated the twin towns of *Tiradentes* (formerly *S. José del Rey*), and *S. João del Rey*, founded by the

Paulistas in the second half of the seventeenth century. Although no longer important mining centres, these places have become busy market towns in the midst of numerous German, Belgian, and Italian settlers, who grow corn and tobacco, and also occupy themselves with stock-breeding and dairy-farming.

The vine thrives in this district, though less exuberantly than in the industrious municipality of *Campanha*, which lies to the south-west in a valley draining to the Rio Grande.

S. João del Rey is amongst the towns which aspire to the honour of being

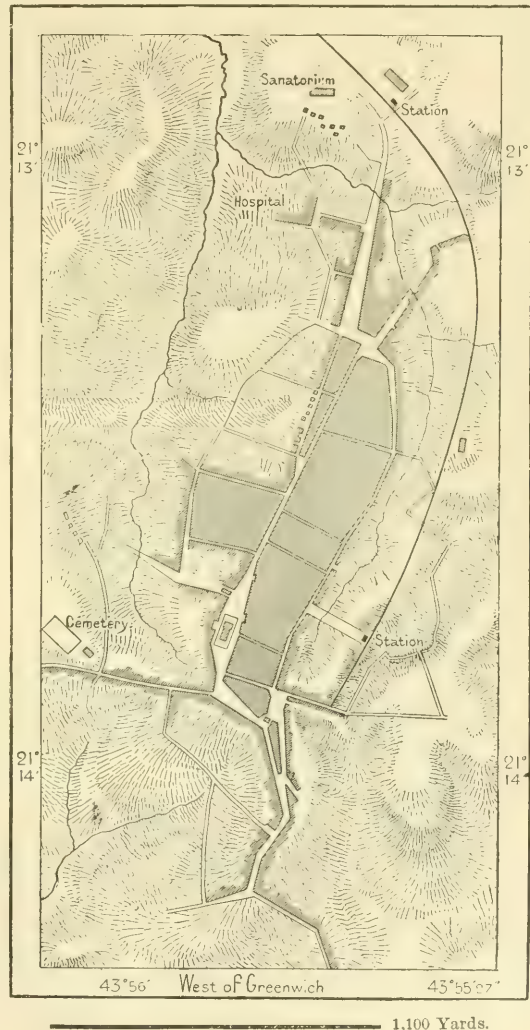
selected as the federal capital. The commission appointed to examine the rival claims and report on the most convenient site for the future metropolis of Brazil has revived the idea of the Marquis de Pombal, who favoured S. Paulo. It recommended in the first place *Varzea do Marçal*, in a pleasant gently sloping valley, which stretches east of S. João beyond the Rio das Mortes. Although pent up in a narrow gorge with steep escarpments preventing the free circulation of the air, and close to a deep sink where were formerly collected the waters of the surrounding mines, S. João is a healthy town. *Varzea do Marçal* would appear to be still more favourably situated on breezy terraces with abundance of pure water and ample space for expansion in the direction of Tiradentes.

The southern region of Minas Geraes, wedged in between the States of Rio de Janeiro and S. Paulo, abounds more than any other part of Brazil in thermal waters. Here are to be found, within easy reach of the capital and in a salubrious climate, all the restorative conditions which so many citizens of Rio travel yearly all the way to Europe in search of. The hills rising to the south of Campanha bear the name of *Serra das Aguas Virtuosas*, "Range of the Salutary Waters," and the church erected on the spot has been dedicated to "Our Lady of Health."

Strangers have already been attracted to the *Lamبارy* springs, near the river of like name, but in less numbers than to those of *Caxambu*, a watering-place over two miles south-west of *Baependy*, at the foot of a dome-shaped mountain. The six chief springs of this place, gaseous and alkaline, resemble those of Coutrexeville. Other mineral streams occur at *Coutendas*, in a neighbouring valley, and 125 miles farther west *Caldas*, formerly *Ouro Fino*, occupies the centre of another thermal region draining through the Rio Sapucahy to the Rio Grande. In this rugged mountainous district *Poços de Caldas*, with its

Fig. 90.—BARBACENA.

Scale 1 : 23,000.

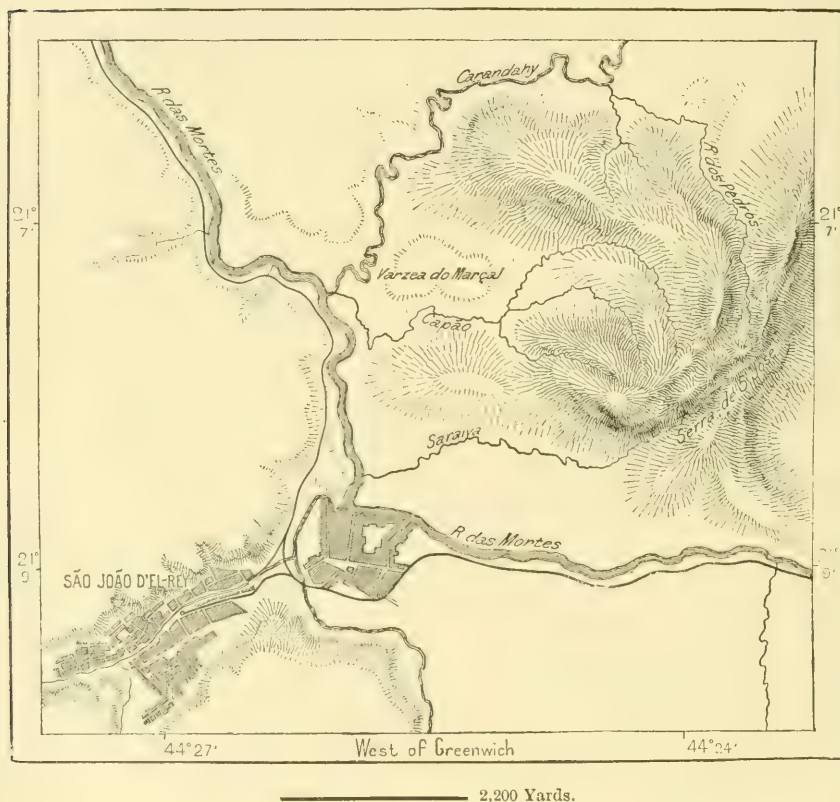


bathing establishments and groups of villas, stands on a rivulet fed by four sulphurous springs. The district is reached from the stations of *Campinas* and *Mogy Mirim*, on a branch line belonging to the S. Paulo railway system.

Uberaba, natural centre of the *Triangulo Mineiro*, "Mining Triangle," that is, the western section of Minas between the Paranyhyba and Rio Grande headwaters of the Parana, lies on the Campos north of the Rio Grande, and is at present the most important place in the Brazilian Far West. Founded in 1807 in the midst of the Cayapo Indians, it has already become a busy trading centre, forwarding to

Fig. 91.—S. JOÃO DEL REY AND VARZEA DO MARÇAL.

Scale 1 : 80,000.



Goyas and Matto Grosso the goods brought up by rail from the coast, and exporting in return livestock and agricultural produce. Westwards the railway is to be continued through the flourishing town of *Fructal* to the Maribondo Falls, at the head of the navigation on the Rio Grande. The *Cruzeiro do Sul*, "Southern Star," largest diamond of the New World, was found in 1854 near *Bagagem*, in the gravels of a brook flowing to the Paranyhyba.

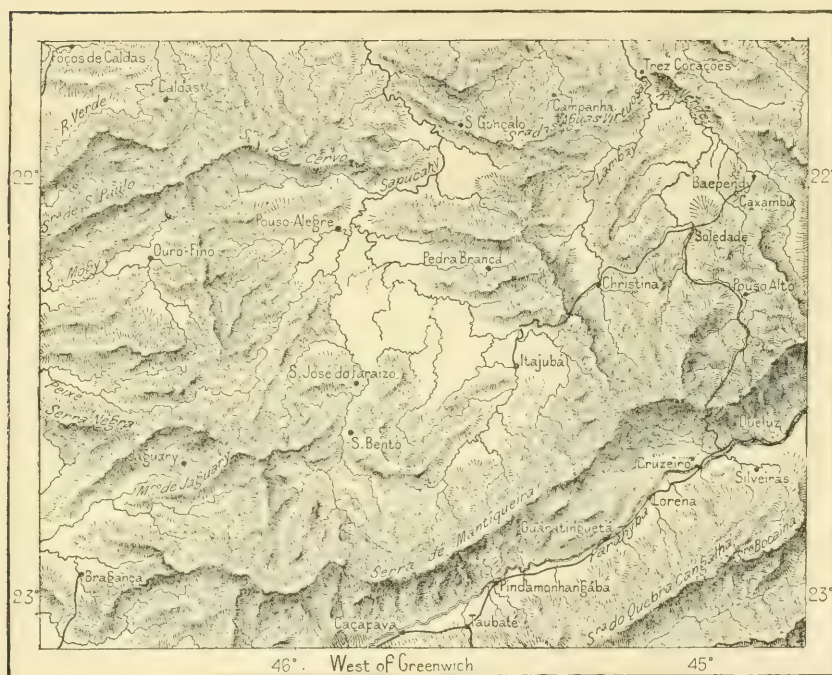
In the Paranyhyba valley, traversed by the trunk-line between Rio de Janeiro and S. Paulo, are situated several important places, such as *Caçapava*, *Taubaté*, *Pindamonhangaba*, *Guaratingueta*, *Lorena*, and *Cruzeiro*. Taubaté, the old

Itaboaé of the Guayanas, takes the first place from the historic standpoint. The natives who inhabited the district on the arrival of the Portuguese in the sixteenth century were at war with the people of Piratininga, the colony which gave birth to S. Paulo, and the rivalries of these Indian tribes were perpetuated by their half-caste descendants. Conflicts frequently took place between the miners of S. Paulo and those of Taubaté, and at the beginning of the eighteenth century the very children fought on both sides during the sanguinary war of the Emboabas, which dyed red the waters of the Rio das Mortes.

At present Taubaté has been greatly distanced by S. Paulo, although it is still

Fig. 92.—REGION OF THE MINAS GERAES THERMAL WATERS.

Scale 1 : 2,000,000.

 30 Miles.

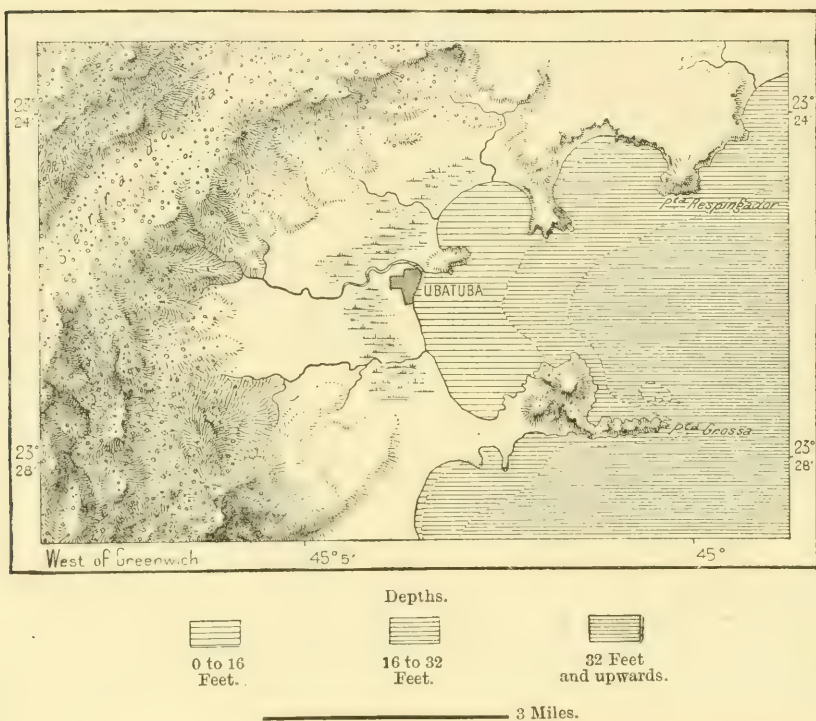
a thriving place, with factories, plantations, and bituminous springs, yielding a mineral oil and gas for the local consumption. On the completion of a branch from the trunk line Taubaté will become a depôt for the coffees grown in the eastern parts of the State of S. Paulo. This branch, which has a station at *Parahybuna*, near the source of the Parahyba, crosses the coast range and descends by steep gradients down to the port of *Ubatuba*. Although now little frequented, this deep harbour, sheltered on the east by the headland of Ponta Grossa, cannot fail to become a flourishing seaport as soon as the coffee-growing districts are tapped by the Taubaté railway now in progress.

West of the upper Parahyba basin the Rio and S. Paulo trunk line crosses

the watershed at an altitude of about 2,620 feet. *Mogy das Cruzes*, capital of the district, has been chosen as the cross junction of another line, which, like that of Taubaté, will also share in the heavy traffic at present monopolised by the Santos line. From *Mogy das Cruzes* the new route will ascend the Tieté valley, and after crossing the Serra do Mar will descend to the port of *S. Sebastião*, facing the island of like name. This perfectly sheltered basin, with depths of 10 to 15 fathoms within half a cable's length of the shore, might easily accom-

Fig. 93.—UBATUBA HARBOUR.

Scale 1 : 160,000.



modate all the commercial navy of Brazil; but for lack of communications it has hitherto been little frequented.

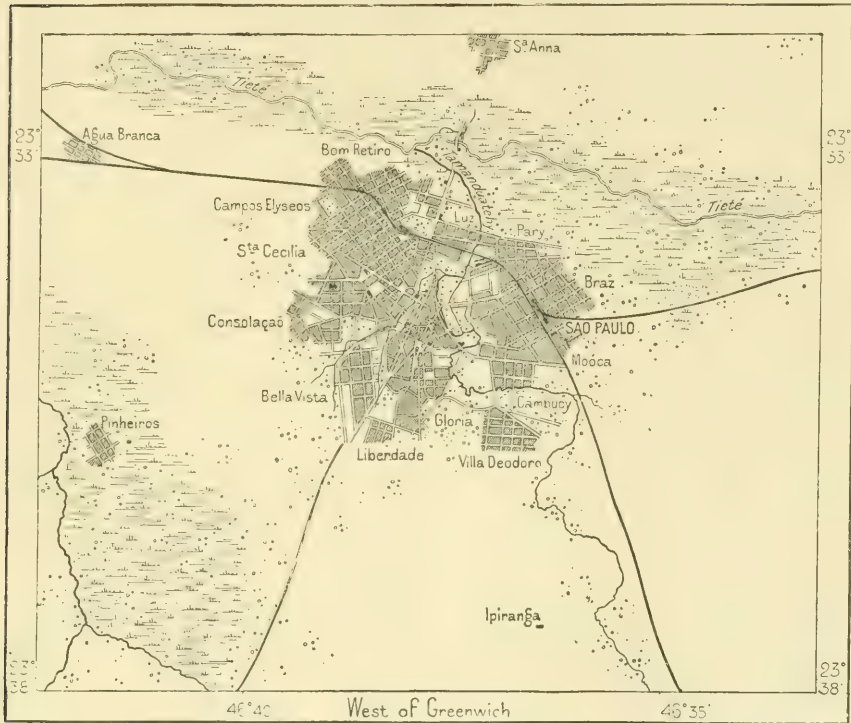
TOWNS OF THE STATE OF S. PAULO.

S. Paulo, capital of the most commercial and industrious State in the republic, dates from 1560, when the Jesuits established themselves on the high bluff washed by the Rio Tamanduatehy, now occupying the heart of the city. After filling the triangular space, limited east by this river and west by the Saracuro, the rising settlement covered the steep slopes hitherto separating it from the outer quarters, which began to spring up in all directions. It already occupies a space of at least 10 square miles, and is connected by a superb viaduct with a

new district beyond the Rio Saracuro. Eastwards spreads another quarter, occupied chiefly by Italians, where the badly kept streets and open drains contrast unfavourably with the handsome structures and villas of the western parts. But the drainage is everywhere defective, and despite its altitude of 2,460 feet above the sea, and an abundance of pure water brought by an aqueduct from the Serra Cantareira, S. Paulo is not quite healthy. In recent years it has even occasionally been visited by yellow fever introduced from Santos. A fine public park stretches north of the city, near the "English" station, and a botanic

Fig. 94.—S. PAULO.

Scale 1: 130,000.



garden is being laid out in connection with the neighbouring natural history museum.

The old Jesuit college has been transformed to the government palace, and the house built by the fathers for the Indian cacique, Tebycira, has been replaced by the Convent of S. Bento. Near these structures stand the chief monuments, churches, post-office, banks, and school of law, "the eyrie," where are incubated the future politicians of the country. The population, nearly half Italian, appears to have increased about threefold during the past decade, and in recent years S. Paulo has become a busy industrial hive, as well as a great agricultural centre. Amongst the attractions of the neighbourhood are the race-

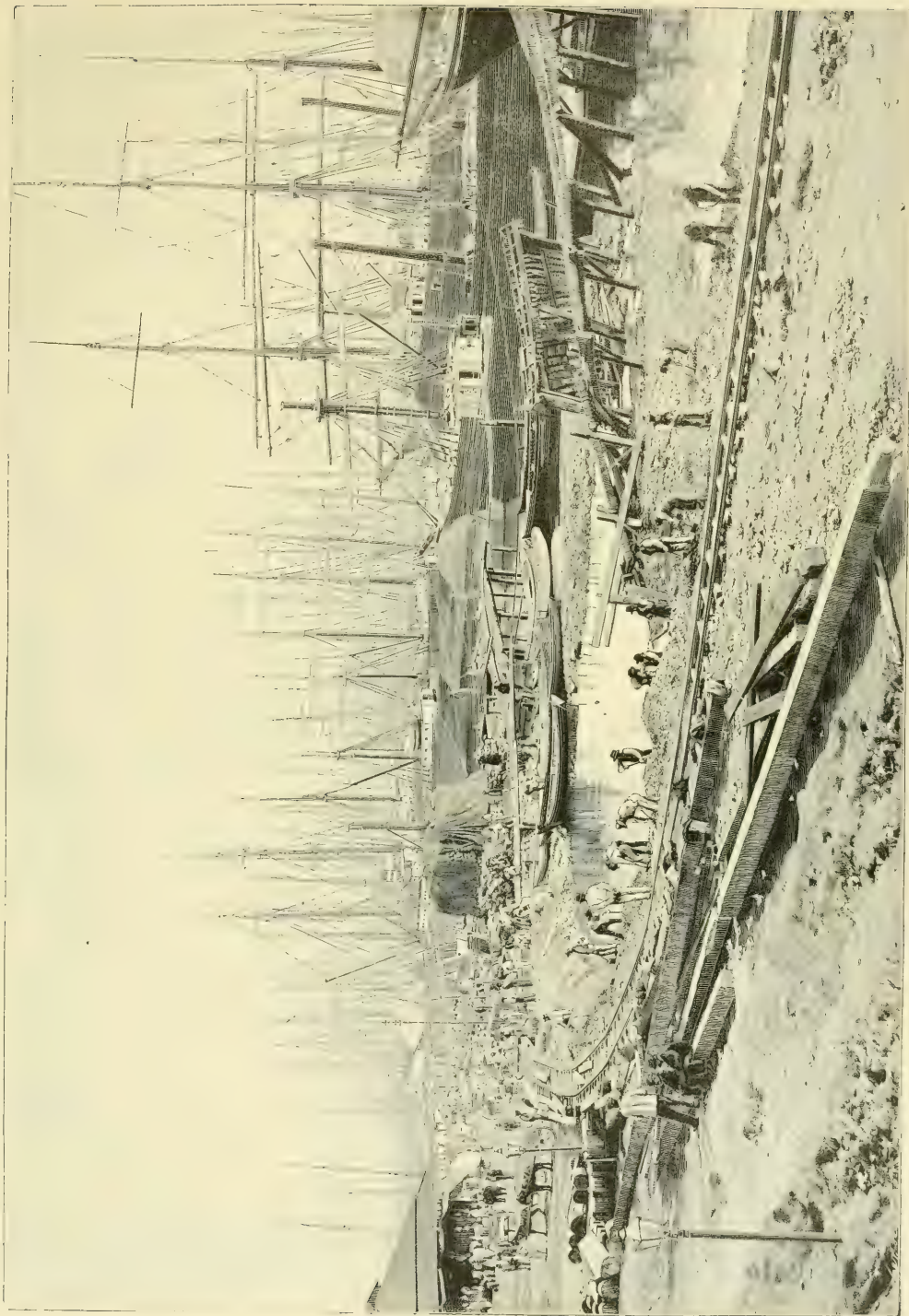
course, the much-frequented shrine of *la Penha*, crowning a bluff east of the city, and the imposing but still unoccupied palace of *Ipiranga*, the finest architectural building in Brazil, erected by the Italian architect, Bezzi, to commemorate the establishment of the empire.

Santos, formerly *Todos os Santos*, "All Hallows," is at once the depôt and outlet for the trade of S. Paulo. The first settlement on this coast dates from 1532, when the present watering-place of *S. Vicente* was founded five or six miles farther east. Here was produced the first sugar in Brazil, extracted from the cane introduced from Madeira, and here the Jesuits established the first primary school in 1566. This outer port, standing like Santos itself on an island separated by a narrow strait from the mainland, continued till the year 1709 to rank as the capital of the section of the Brazilian seaboard stretching for about 600 miles between Macahé and Cananea.

Santos, regularly planned, but badly kept, extends along the foot of the steep Monserate eminence, which occupies the centre of the island, and which is crowned by a church commanding a superb panoramic view. But the site of the city is hopelessly insalubrious; or at least to make it healthy it would be necessary to raise the miry soil, sodden with the rain and tidal waters mingling with the slush of the sewers. Mudbanks are exposed at low water, while the putrid carcasses of cattle embedded in the sands, are left to the carrion birds, which do duty as scavengers. Hence no place in the New World has suffered more from yellow fever in proportion to its population than Santos. At times all work has been suspended by the death or flight of the employees, and vessels abandoned by their crews have been seen drifting helplessly in the bay. As the bad season approaches, nearly the whole population takes refuge in the health resorts of the surrounding heights, or in *Balnearia* and other watering-places on the coast.

Yet, despite these recurrent epidemics, Santos is the centre of a large import and export trade, averaging collectively about £15,000,000 a year. Formerly it exported the produce of Minas Geraes, and even of Matto Grosso; but at present it is the outlet mainly of the State of S. Paulo, whose trade, however, is steadily increasing. To meet the growing traffic various harbour works have been undertaken, and the largest vessels will soon be able to load and unload at the wharves. The English, and next to them the Norwegians, take the largest share of the general movement of Santos, which is regularly visited by as many as twenty lines of steamers. A splendid railway, constructed by English engineers, across the primeval forests of *Cubatão*, and over the coast range, serves to bring down the coffees of S. Paulo, and to forward to the interior rice from India, Newfoundland cod, English coal, and all kinds of European manufactured goods.

But this line is already quite inadequate to meet the demands of the local trade, and the frequent blocks and delays in forwarding goods, are driving commerce to seek new and costly routes. Two Paulist companies, one in the west, the other in the east, have been formed to compete with the English society



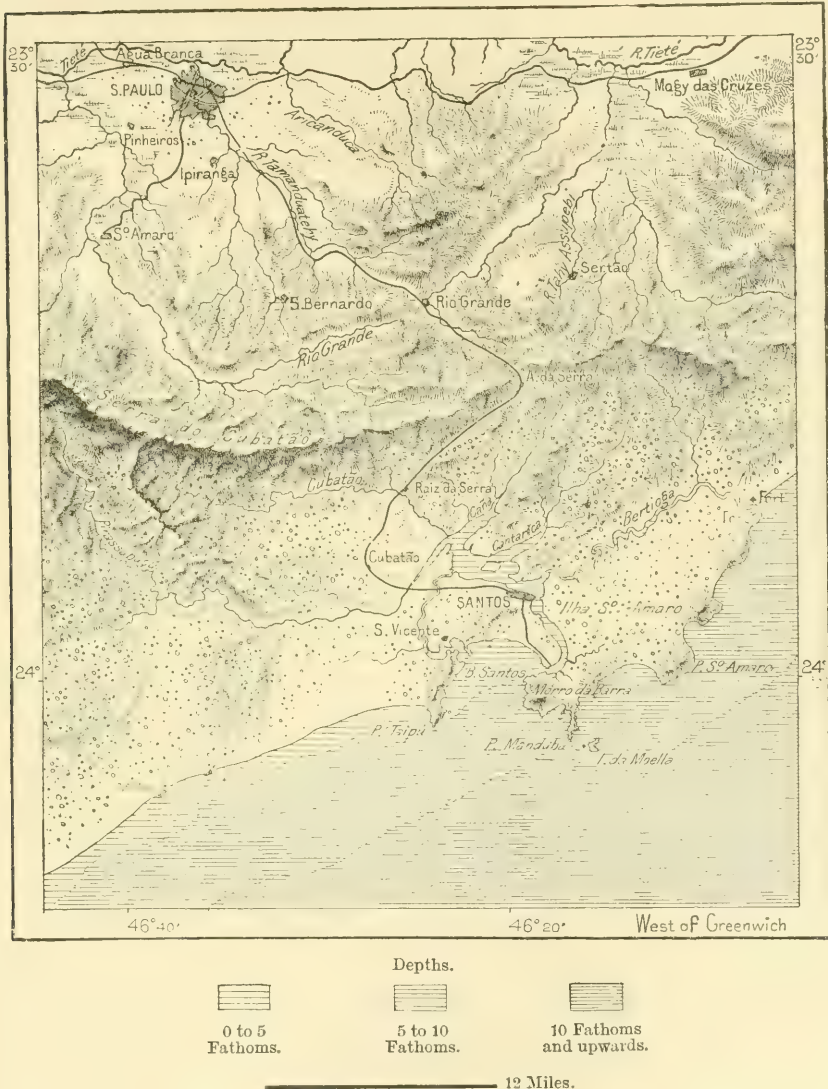
SANTOS HARBOUR—VIEW TAKEN IN 1891.

and relieve the congested traffic between S. Paulo and Santos. Other independent corporations are also planning fresh routes from the interior to Ubatuba, *S. Sebastião*, and other future rivals of Santos on the coast.

Meanwhile the Santos line ramifies north of S. Paulo in various directions,

Fig. 95.—FROM SANTOS TO S. PAULO.

Scale 1 : 650,000.



penetrating into the "Far West," as the coffee-growing districts of the State are called. The main branch, after leaving S. Paulo, crosses the Rio Tieté and surmounts the Cantareira heights east of the Jaragua Peak. The first station, *Jundiahy*, which serves as the terminus of the English railway, is followed by the busy trading centre, *Campinas*, which unfortunately occupies an unhealthy

site, subject to torrid heats and to visitations of yellow fever, which in 1892 carried off nearly 3,000, or about one-sixth of the whole population. Campinas boasts of being the birthplace of the composer, Carlos Gomez, and since 1817 the municipality has squandered vast sums on a commonplace church intended chiefly as a repository for the superb woodcarvings to which an artist of Minas Geraes devoted his whole life.

Sugar, till recently the chief agricultural product, is now mainly replaced by

Fig. 96.—COFFEE PLANTATIONS NORTH OF S. PAULO.

Scale 1 : 3,000,000.



coffee, which thrives marvellously on the "red soil" covering a great part of the northern and eastern districts. The school of agriculture founded near Campinas serves chiefly for the instruction of planters, while the railway system owes its existence entirely to this industry.

The main branch, running north of Campinas, passes the important towns of *Casa Branca*, *S. Simão*, and *Ribeirão Preto*. The last named, of quite recent origin, is already the centre of the most extensive coffee plantations in the world.

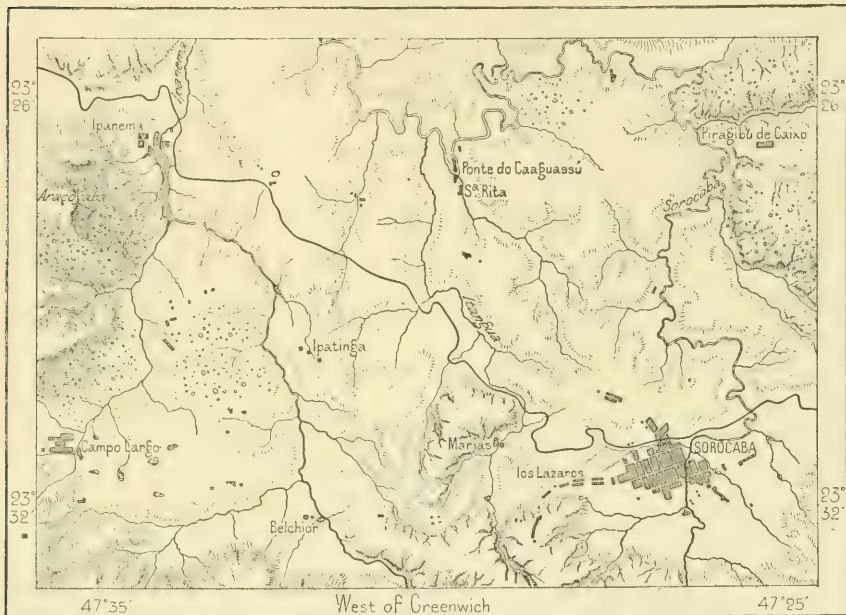
Farther on the line mounts the plateau about 3,000 feet high, and after passing the stations of *Batataes* and *Franca*, descends to the valley of the Rio Grande, which is crossed by a viaduct 1,316 feet long. Near Franca diamonds are found.

Another line, starting also from Campinas, ramifies beyond *Limeira* in one direction through *Araras* and *Pirassununga* to the Rio Mogy Guassu, in another to *Rio Claro*, and thence northwards to *Jaboticabal* in the campos region.

In the Tieté valley, also connected by rail with the capital, occur several thriving places, such as *Itu*, an old Jesuit mission dating from 1610, and still a great religious centre with a large Jesuit college, and more churches for its size than any other town. At the foot of the terrace on which *Itu* stands the Tieté

Fig. 97.—SOROCABA AND IPANEMA IRON MINES.

Scale 1 : 200,000.



develops the magnificent cataracts which supply motive power to the workshops of *Salto d'Itu*, "Itu Falls." *Piracicaba*, north-west of *Itu* on an affluent of the Tieté, also utilises a neighbouring cascade for its sugar and cotton-spinning mills. This cascade stands at the head of navigation, whereas the Tieté is inaccessible even to boats above *Porto Feliz* some 30 miles west of *Salto d'Itu*. The Tieté and *Piracicaba* steamers plying on the river farther down ship the coffee of the western plantations in districts, to which the railways have not yet penetrated. The two military colonies established in the vicinity of the *Avanhandava* and *Itapura* cataracts, have not succeeded. These places, in the language of a provincial report, were for a long time nothing more than "official expressions."

Sorocaba, on a southern affluent of the Tieté, 70 miles west of the capital,

presents a solitary spectacle of decadence in the State of S. Paulo. It has been ruined by the railways which have brought prosperity to so many other places. Till recently it was the central market for cattle, and especially for mules forwarded by the Rio Grande do Sul stock-breeders. As many as 200,000 animals were often seen at its fairs, and the mules of Rio Grande are still distributed over the States of Santa Catharina and Parana, and even enter that of S. Paulo through the *Faxina* route. But on reaching the various stations they are at once forwarded by rail direct to the plateaux and coastlands, so that the Sorocaba market receives yearly less and less of this traffic.

The iron industry of *Ipanema*, in the same district, has also suffered, though from another cause. This place, which takes its name from an affluent of the Rio Sorocaba, is famous for its ferruginous ores, yielding from 70 to 80 per cent. of excellent metal. Nevertheless, the works established on the spot have not succeeded, despite government support. Everything costs more than it fetches, and the ferruginous mount *Araçoyaba* (3,180 feet), commonly called *o morro do ferro*, "Iron Mount," remains little utilised.

At present (1894) *Botucatu* is the last important place in the cultivated region. Beyond the surrounding coffee plantations begin the vast unexplored solitudes comprised between the lower Tieté and the Paranapanema. Since the seventeenth century a great shifting of the aboriginal populations has taken place in this region. Over 100,000 civilised Indians were grouped round the settlements of *S. Ignacio Mayor* and other places on the Paranapanema and Parana rivers. But the land was depopulated by the slave-mongers, and the work of colonisation, and even to some extent of geographical exploration, has to be begun again. Some progress, however, has already been made, and in 1890 the annual production of cattle was estimated at 100,000. A beginning had also been made with sugar, coffee, cotton and tobacco growing.

The southern part of the State, still unconnected with the capital by carriage roads or railways, constitutes, with the conterminous districts of Parana, a perfectly distinct geographical region. It is but thinly settled, and its chief towns are mere villages, such as *Apiahy*, now forsaken by the gold-hunters; *Xiririca*, with unworked quarries of lovely white marble; *Iguapé* and *Cananea*, two small riverside ports, the former near the mouth of the Ribeirão, communicating by a navigable canal with the so-called *Mar Pequeno*, "Little Sea," which extends for over 60 miles along the banks. *Cananea*, occupying an island in this flooded depression, is accessible to large river craft at high water. This port marks the spot where Christovão Jacques and Amerigo Vespucci landed in 1503, and from the same place set out the first *bandeira* of eighty adventurers in search of gold, not one of whom ever returned.

TOWNS OF THE STATE OF PARANA.

Curitiba, capital of the State of Parana, stands, like S. Paulo, on a plateau bounded eastwards by the Serra do Mar, and, like it, is connected by rail with an



PARANAGUA-CURITIBA RAILWAY—VIEW TAKEN AT THE MORRO DE MARUMBY.

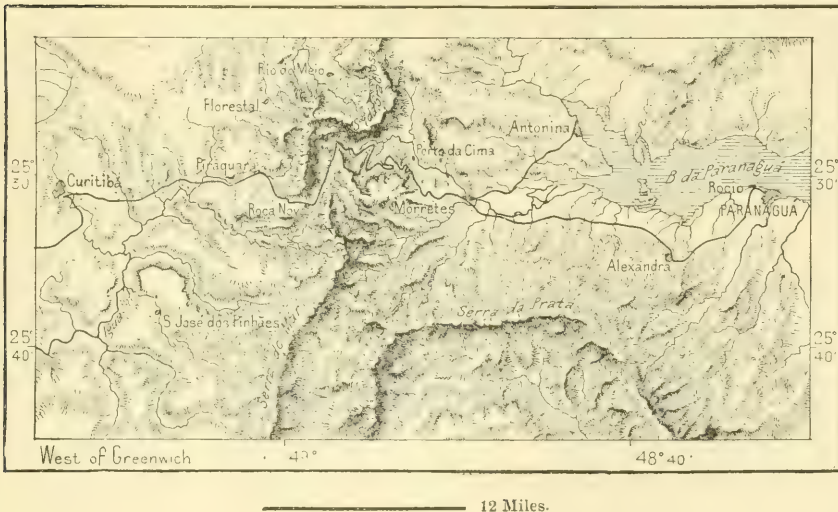
outlet on the Atlantic. Standing at an altitude of 2,920 feet, Curitiba enjoys a temperate climate, and is surrounded by European settlers who bring to its market the fruits and vegetables of the Old World. It ranks as a capital only since the year 1854, when the territory of Parana was detached from S. Paulo and constituted a separate province.

A carriage road running to the coast by the town of *Graciosa* was supplemented in 1885, by the railway, which, after turning the superb Mount Morumby (4,700 feet), descends through a series of cuttings, tunnels, and viaducts to the foot of the mountains at *Morretes*. The highest point reached stands at the entrance of a tunnel 3,135 feet above the sea, and from the successive terraces and inclined planes magnificent views are afforded of the surrounding mountains, slopes, and lowland tracts, stretching away to Paranagua Bay.

At Morretes, formerly a centre of the maté export trade, the railway bifurcates,

Fig. 98.—FROM CURITIBA TO PARANAGUA.

Scale 1 : 800,000.



one branch running north-west to the port of *Antonina*, which though shallower than that of Paranagua, is still accessible to vessels drawing 14 or 16 feet. During the floods, which often threaten to inundate the main line between Morretes and Paranagua, the Antonina branch offers an alternative route for the foreign trade of Curitiba.

Paranagua standing on the north (left) bank of the Itubere (Itibiri) estuary, is no longer directly accessible to large vessels, which have to ride at anchor at a distance of over a mile to the north-west in the deep waters of the bay sheltered from the east by the hilly *Cotinga Island*. The town itself is moving in this direction, and numerous new structures already extend along the new harbour. Its export trade is mainly restricted to forest produce, such as araucaria wood and yerba maté, obtained from the *ilex coritybensis*, a plant allied to that which

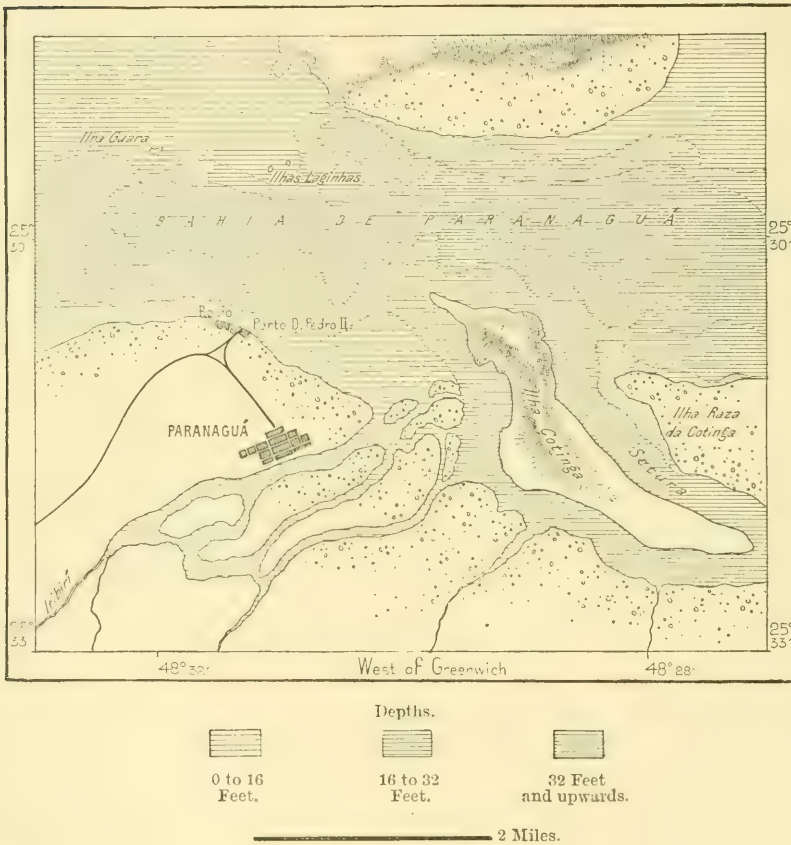
yields the maté of Paraguay. Nearly 20,000 tons of this article were exported in 1892, valued at £312,000.

Visitors are still shown the ruins of the old Jesuit College, former headquarters of the Parana missions. In the surrounding forest clearings are several agricultural settlements, the most important of which is *Alexandra*, where a group of Italian colonists cultivates alimentary plants, and have also laid out some sugar and coffee plantations.

In the interior, west of Curitiba, some flourishing colonies have developed

Fig. 99.—PARANAGUA.

Scale 1 : 100,000.



into towns such as *Campo Largo* and *Palmeira*, and farther north *Ponta Grossa* on the upland plains watered by the Tibagy. Till recently nearly all the German settlers were attracted to the States of Santa Catharina and Rio Grande do Sul ; at present the stream of Italian immigration is setting in the direction of S. Paulo, while Parana is favoured chiefly by the Poles. Yet this movement began with the disastrous undertaking of 1878, when 1,366 Slav peasants were introduced without any preparations being made for their reception. Left at *Palmeira*

to their own resources, many perished, and of the survivors some found their way back to Europe, while others were removed to the United States.

The handful that remained on the spot became the nucleus of fresh colonies, which have gradually reclaimed the wastes on the elevated campos watered by the Rio Iguazu. Most of these "Russians," as they are generally called, come from Prussian and Austrian Poland, though in quite recent years they have been joined by Russian Poles, driven by religious persecutions from the provinces of Lithuania and the Vistula. For a space of 18 or 20 miles Curitiba is surrounded by these exclusively Polish colonies, which even officially take the name of "New Poland." Others are settled about Palmeira, and along the right bank of the Iguazu all the way to the new station of Porto União. Other groups have established themselves in the southern parts of the State on the Rio Negro and Rio Vermelho towards the Santa Catharina frontier.

These Polish colonists, among whom not a single Jew is found, are approximately estimated at 100,000, or about one-third of the whole population of Parana. The mortality is extremely low, so that the natural increase by the excess of births over deaths rises to an average of four per cent., a proportion rarely attained in any country. The Poles of Parana preserve their language and national usages; they have their own churches and schools, and even support a newspaper. Being nearly all peasants, they have monopolised the production of cereals and vegetables, and have begun to drive back towards S. Paulo the settlers of other nationalities. One of these groups, however, the Italian communist settlement of *La Cecilia*, near Palmeira, has hitherto resisted the Slav invasion.

Although gold occurs at Campo Largo and quicksilver at Palmeira, Parana is more noted for its natural curiosities than for its mineral resources. Some 20 miles east of Ponta Grossa, the argillaceous ground is pierced by three astonishing *buracos* or pits, one of which is no less than 560 feet deep and 264 feet wide at the mouth. A sluggish stream flowing at the bottom passes from chasm to chasm towards a lagoon which drains to the Rio Tibagy. Farther east a crumbling mass of old red sandstone has received the name of *Villa Velha*, "Old Town," from the pyramids and other fantastic forms which it has assumed.

In 1894 Curitiba possessed only one railway running through *Lapa* to the Santa Catharina frontier. The Rio Iguazu, crossed by this line, becomes navigable at *Porto do Amazonas*, some 60 miles west of the capital, but 125 miles lower down the stream is interrupted by numerous rapids. Owing to the general lack of communications nearly the whole of the fertile western districts of Parana still remain a vast wilderness roamed only by a few bands of *Coroados*. Here the traveller lights upon the shapeless ruins of former missions, such as *Villa Rica* in the Rio Ivahy valley, and at the confluence of the Piquiry with the Parana, the central station of *la Guayra*, headquarters of the vast theocratic empire founded by the Jesuits and ruined by the Paulistas. In this region almost the only recent colonial settlement is that of *Guarapava*, not far from the head of the Rio Ivahy, which here develops a superb cascade 248 feet high.

In 1889 the Brazilian Government selected a site at the confluence of the

Iguazu with the Parana, below the great falls, for the military colony of *Foz de Iguazu*, which has since become a free settlement with a mixed Brazilian, Paraguayan, and French population of 700 souls chiefly engaged in collecting maté and cultivating cereals. Foz de Iguazu occupies an important strategical position as a frontier station towards Paraguay and Argentina. Here a beginning has already been made with a national arsenal and a flotilla, and there can be no doubt that sooner or later an important centre of population must spring up either at Foz de Iguazu, or at some other confluence in the neighbourhood. In this district the valley of the Parana is intersected by the shortest highway running from the Atlantic seaboard westwards to Matto Grosso, that is, to the geographical centre of the Continent. The position is somewhat analogous to that of St. Louis on the Mississippi.

TOWNS OF SANTA CATHARINA.

This State, which takes its name from the long island of Santa Catharina, the Juru Mirim of the Indians, has benefited more than any other region of Brazil by the movement of immigration controlled by the Government. If a "New Germany" has not been developed in Santa Catharina and the neighbouring Rio Grande do Sul, at least the German language prevails in many districts, and thanks to the higher standard of education this State exercises an influence in public affairs out of proportion to its slight population.

In 1849 a Hamburg trading association introduced the first German colonists, who established themselves on the banks of the Rio Cachoeira. The rising station took the name of *Joinville*, in honour of the French prince to whom a territory of about 60,000 square miles had been ceded as the dowry of dona Francisca, sister of the Emperor of Brazil. The district soon assumed the aspect of a flourishing German domain, and of the 19,000 present inhabitants of the municipality over 14,000 claim German or Polish descent. Breweries, distilleries, and other workshops have sprung up round about Joinville, and hundreds of waggons are engaged in carting to the port of S. Francisco the maté, tobacco, maize, tapioca, butter, and other produce raised in the district.

A carriage road crossing the Serra do Mar runs northwards to *S. Bento* and other colonies about the Parana frontier, and at *Rio Negro* this highway joins the railroad from Curitiba.

S. Francisco, where is centred all the local traffic, is one of the best harbours on the coast. The channel separating S. Francisco Island from the mainland has a depth of 20 feet, and offers excellent anchorage to the shipping, which is here sheltered from all winds.

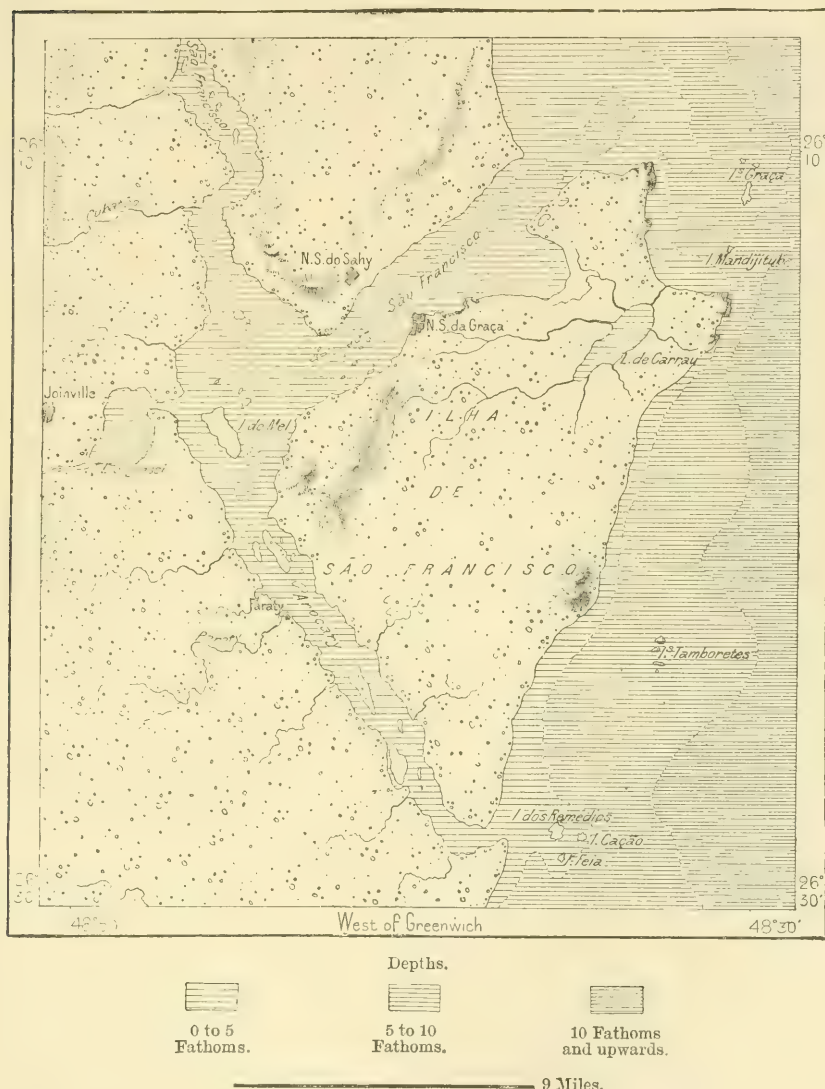
Blumenau on the Rio Itajahy, south-west of Joinville, dates from 1852, when it was founded by the German speculator from whom it takes its name. From the first it had a hard battle to fight with adverse circumstances, but it has at last entered on a prosperous career, and numerous roads now radiate in all directions through a rich district studded with mills, workshops, and farmsteads. Steamers plying on the Itajahy communicate with the port of *Nova Trento*, where the

Germans are in a majority, although it takes its name from some immigrants from Trent, who settled here in 1870.

South of the Rio Itajahy follow a few little seaports as far as Desterro Strait, with which begins the colonial history of the country. Juan de Solis, who pene-

Fig. 100.—S. FRANCISCO ISLAND.

Scale 1 : 375,000.

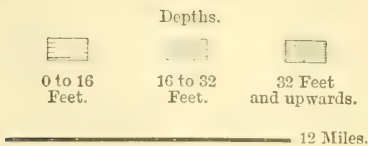
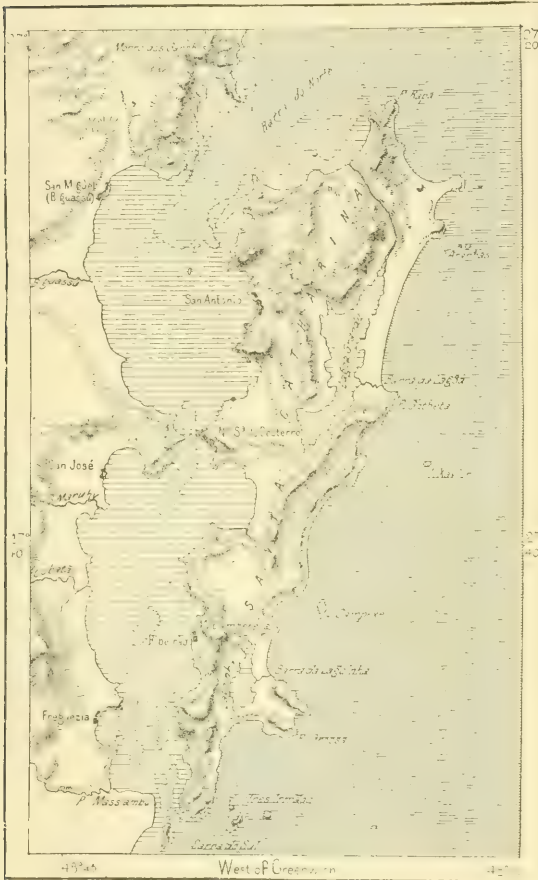


trated into this magnificent channel in 1515, was followed ten years later by Sebastian Cabot; but the capital of the island, which afterwards became the capital of the State, was not founded till 1650. The exile, Velho Monteiro, gave his settlement the name of *Nossa Senhora do Desterro*, "Our Lady of Exile," while the island was named Santa Catharina from one of his daughters.

Desterro, standing on the nearest point of the west coast to the mainland, made steady progress from decade to decade, without acquiring the importance that might be expected from its well-sheltered harbour, accessible from the north to vessels drawing 12 or 14 feet. But the bar at the southern entrance of the strait, here 1,150 feet wide, has only five feet of water on the sill. On the mainland

Fig. 101.—SANTA CATHARINA ISLAND.

Scale 1 : 540,000.



the most frequented ports are *Biguassu*, near the mouth of the Rio Biguassu, and *S. José*, on a creek nearly opposite *Desterro*. The soil of the island, formerly covered with highly productive coffee plantations, is exhausted, and the hills are now overgrown with scrub.

In recent years the plains watered by the Rio Tubarão have acquired some importance, thanks to the coal that has been discovered on the slopes of the Serra Geral. Though greatly inferior to English coal, the beds lie near the surface, and are consequently easily worked. A railway 66 miles long has been constructed for the transport of the mineral, of which at least 50,000,000 tons are found in the district already surveyed. The line traverses the Tubarão valley, and is carried over a coast lagoon at *Larangeiras* by a viaduct 1,565 yards long, the most important work of the kind in South America. Beyond the viaduct the line ramifies northwards to the port of *Imbituba*, southwards to that of *Laguna*, at the extremity of a sandy peninsula limited on the east by a shallow lagoon. Both ports

are of difficult access, and Imbituba, though better sheltered and deeper, is threatened by the dunes moving north under the action of the winds. Owing to the disturbance caused by two different tidal waves, the ebb and flow is extremely irregular at Laguna. The rise at high water is scarcely more than three feet ; it seems to depend mainly on the direction of the winds, and it frequently

happens that the complete tidal movement is spread over a period of twenty-four hours. The sandy spit west of Laguna is almost entirely covered by an enormous tambaqui (kitchen midden), containing a vast accumulation of shells dating back to prehistoric times.

Lages, the chief place on the inland Campos, is mainly a stockbreeding centre, and cattle are forwarded from this place, overland, to Sorocaba. The breeders own about 300,000 oxen on the pastures stretching westwards, in the direction of the savannas claimed by Argentina.





CHAPTER XII.

URUGUAY BASIN AND ADJACENT SEABOARD.

STATE OF SAN PEDRO OR RIO GRANDE DO SUL.



ESPIE its relatively small extent, this region, named from an inlet which the first navigators mistook, as they had mistaken the Bay of Rio, for a great river, is one of the best adapted, by its natural resources, to constitute an independent State. It has often, in fact, played an independent part, and its position as a border land towards the Spanish domain gave it too much importance under the Portuguese rule to be granted as a fief, like so many other provinces of Brazil.

But, although it had consequently always been governed directly by the crown, its inhabitants were none the less enthusiastic in hailing the proclamation of independence. Then feeling the yoke of Rio as much as they had before felt that of Lisbon, they attempted to set up for themselves, and a fierce civil war was waged for nine years (1835—44) between the *farrapos* (republicans) and the *caramurus* (monarchists). This was the heroic period in the history of Rio Grande, associated with the name of the great guerilla chief, Garibaldi. It required all the resources of the vast empire of Brazil to wrest the little "republic" of Rio Grande from the band of adventurers led by this famous captain.

Since then the southern province has had, from its very position, to bear the brunt of the border warfare carried on at one time against Argentina, at another against Paraguay. Lastly, since the proclamation of the Brazilian republic, Rio Grande, true to its traditional hatred of centralisation, has begun a fierce struggle for its local autonomy. Here was struck the first blow against the military dictatorship of Rio de Janeiro, and from this region the revolution gradually spread to a great part of Brazil. Long after the surrender of the rebel fleet, in the spring of 1894, the revolt was kept alive in Rio Grande.

BOUNDARIES—EXTENT—SETTLEMENT.

Towards Argentina Rio Grande is bounded by the natural frontier of the Rio Uruguay; but southwards the vicissitudes of war have caused a purely conventional frontier to be adopted towards the conterminous republic of Uruguay. The line, which, on the coast, coincides with the little river Chuy, runs inland across the Lagoa Mirim to the mouth of the Jaguarão, which constitutes the frontier as far as the Alto da Mina rivulet. Here begins a sinuous line, traced from hill to hill north-westwards to the divide between the two rivers, Ibicuy Grande and Tacuarembó, beyond which the boundary is formed by the course of the Rio Quaraim.

Rio Grande do Sul thus constitutes a somewhat irregular quadrilateral of about 300 miles on all sides, with a superficial area of over 91,000 square miles, and a vigorous population (1894) of rather over 1,000,000. The territory has been traversed by explorers in all directions, except in the northern campos; but it still lacks accurate maps, for which the preliminary surveys have not even yet been undertaken.

The first settlers were natives of the Azores, who were driven from the Archipelago by famine, and who founded the two cities of Rio Grande and Porto Alegre in 1737 and 1742. German immigrants began to arrive soon after the declaration of independence. Some settled in 1824 on a domain near the spot where now stands S. Leopoldo; these were followed by military settlers, and towards the middle of the century the German colonists numbered over 7,000.

Even the European revolutions exercised a certain influence in the development of Rio Grande. Over 1,000 of the so-called *Brummers*, most of whom had taken part in the German risings of the year 1848, afterwards entered the Brazilian service, and were engaged in the war against the dictator, Rosas. Several men of eminence, members of this volunteer force, became leading citizens of Rio Grande, and to them was due the first educational movement to which this State is indebted for the prominent position it holds in the Brazilian union.

Although the early agricultural colonies have lost the organisation imposed on them by the central or provincial government, and although all immigrants and their descendants have become naturalised Brazilians, the Germanic element has not yet been entirely assimilated. The national sentiment and cohesion, fostered by a foreign language, education and usages, is still kept alive in many districts. But this "State within the State," constituted by aliens, with different aspirations from those of the natives, loses ground in proportion to the rapid increase of other ethnical elements, and especially of such as, through racial and religious affinities, are more readily absorbed in the dominant Lusitano-Brazilian nationality.

Numerous Italian, Spanish, and Slav colonists have also arrived, and in 1875 the Negro element was estimated at over 90,000. Before the final abolition of slavery

Rio Grande had liberated more than half, and in 1885 the anniversary of national independence was celebrated by the emancipation of 10,000.

PHYSICAL FEATURES.

Rio Grande do Sul comprises four natural regions clearly indicated by the general relief of the land. As in the neighbouring States, a "Piedmont" of low lying coastlands stretches along the shores of the Atlantic, and these coastlands are separated by a mountain range some 3,000 feet high from the inland plateau sloping gently towards the Uruguay. But the coastland and coast range are themselves separated by a deep depression in which the Rio Vacacahy, continued by the Jacuhy, winds to the east, and the Ibicuy Grande, a tributary of the Uruguay, to the west.

The north-eastern section of the mountains preserves the name of Serra do Mar, by which they are known as far north as Rio de Janeiro. But south of the Rio Jacuhy the various sections take other names, such as Serra do Herval between the Jacuhy and the Camacuam, and Serra dos Tapes thence to the Jaguarão, while various ridges bear other designations. As in the north, the system consists of crystalline rocks, gneiss, and granites.

In the transverse depression between the sea and the Uruguay is seen the edge of the northern plateau standing out like the steep banks of a river, and this scarp, presenting the aspect of a mountain on its outer face, generally takes the name of Serra. It is decomposed into several groups, which become continuously less precipitous in the direction of the west. The ridges branching off from the Serra proper are known, like the southern heights near Uruguay, by the name of *coxilhas*, "knives," although the crests, instead of being sharp, are disposed in long gently inclined slopes.

In many places the primitive granites underlie layers of tertiary sands; but the relatively recent formations are chiefly represented by erupted traps, which are easily weathered, taking a brown or yellow crust, and changing to that reddish clay which covers nearly all the plains. In some of the central regions traps occupy most of the surface, but they gradually diminish westwards in the direction of the Uruguay. Geologists generally associate with the presence of erupted masses the transformation of argillaceous substances to agates, chalcedony, jasper, and amethysts, which occur in extraordinary quantities in some of the southern districts. Besides these valuable stones Rio Grande also contains gold, silver, copper, tin, lead, iron, kaolin, and coral.

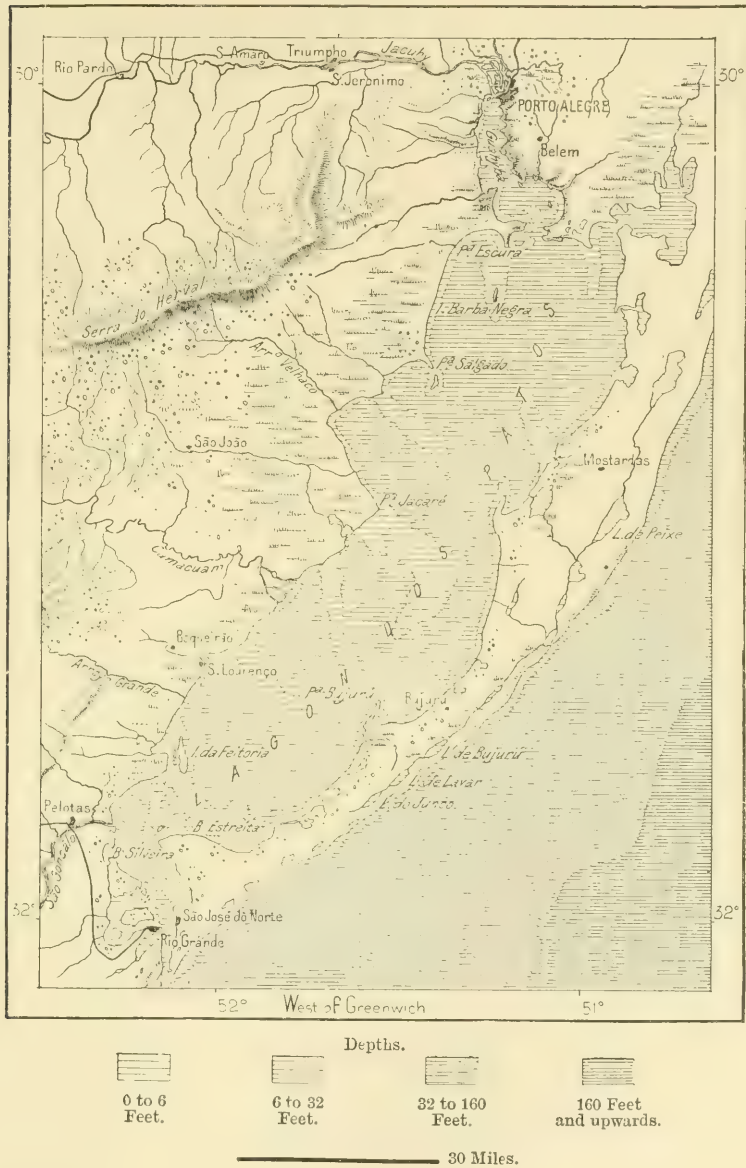
COAST LAGOONS.

The long beach developed in graceful curves along the Atlantic coast is entirely of marine origin. This cordon of sands has been washed up by the waves and modified with every tide by fresh deposits and fresh erosions. Various phenomena point at a general upheaval of the outer beach itself, which now

separates from the sea extensive spaces that have been gradually changed to brackish or even freshwater lagoons. These lagoons, beginning in the State of Santa Catharina, are developed in a continuous chain, varying in size and form,

Fig. 102.—LAGOA DOS PATOS.

Scale 1 : 2.000,000.



some completely closed, others connected by creeks and communicating with the sea by passages open in the wet, closed in the dry season.

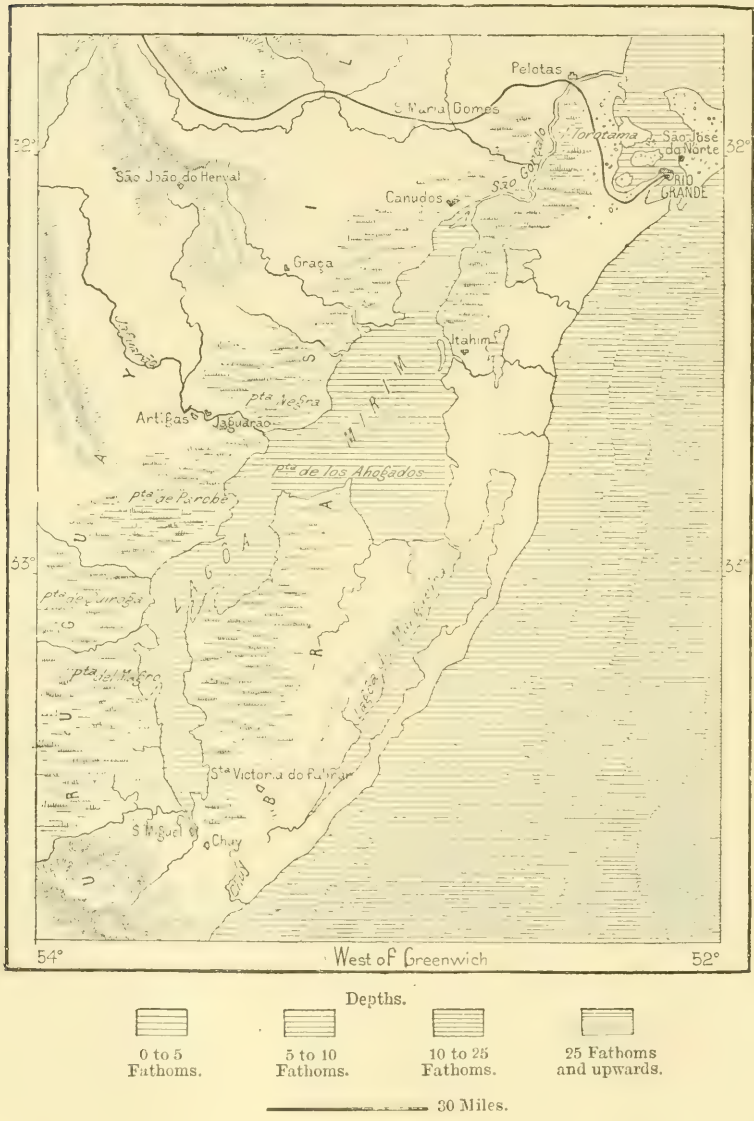
Behind this outer chain another has been formed of still more irregular outlines, and this system is connected by the Capivary with an inland sea about

3,500 square miles in extent. The Lagoa dos Patos, as it is called, owes its name, not to the *patos*, or “ducks,” frequenting its water, but to the Patos Indians, who defended its shores from the European invaders.

Farther south stretches another basin, the Lagoa Mirim,* or “Little Lagoon,”

Fig. 103.—LAGOA MIRIM.

Scale 1 : 2,300,000.



which has been so called only in a relative sense as compared with the somewhat larger northern basin. It stretches north-east and south-west for a distance of no less than 125 miles between Rio Grande and Uruguay.

* *Mirim* means “little,” not in Portuguese, but in the Guarani language.

RIVERS.

Numerous rivers converge in the Lagoa dos Patos, which sends its overflow through the Rio Grande to the Atlantic. The chief affluent, known by various names, is formed towards the centre of the State by the junction of the Vacacahy and Jacuhy, the latter being considered the main branch. Below a great cataract the river becomes navigable, and rapidly increases in volume by the contributions of the Taquary, Cahy, Rio dos Sinos, and other tributaries, mostly descending from the northern uplands. Lower down the Jacuhy develops into an estuary, and under the name of Guahyba, falls through a strait into the Lagoa dos Patos.

The Lagoa Mirim is fed by the Cebolaty from Uruguay and by the Jaguarão frontier stream, and discharges its overflow north-eastwards to the Lagoa dos Patos through the Sangradouro (S. Gonçalo) channel. This emissary, which is joined by the Rio Piratinim, has been deepened and canalised, and is now utilised by trading steamers between the two lagoons. Unfortunately a dangerous bar, the scene of many shipwrecks, obstructs the navigation of the Rio Grande do Sul, through which this extensive system of inland waters communicates with the Atlantic.

On the north-east and north-west Rio Grande is bounded by the Uruguay, which rises within Brazilian territory, and for the greater part of its course either flows through or borders Brazilian lands. It has its source in the Serra do Mar, within thirty miles of the Atlantic, and under various names traverses the region of the campos. From Rio Grande it receives the Uruguay Mirim, "Little Uruguay," and from Santa Catharina numerous affluents, amongst others, the Chapeco and Pepiry Guassu, which have given rise to so many discussions on the subject of the Brazilo-Argentine frontiers.

Below the Pepiry Guassu, "Big Straw-Coloured River," the Uruguay forms the Salto Grande, "Great Falls," where it turns abruptly from the west to the south-west, retaining this direction throughout the whole section of its course between the conterminous republics. In this region its largest affluent is the Ibicuy Grande, which is accessible to small craft for some hundred miles. The mainstream is also navigable, but interrupted at intervals by rapids, so that free navigation begins far to the south of Brazilian territory below the rapids at Salto, a town in Uruguay.

CLIMATE.

In Rio Grande, southernmost of the Brazilian States, the seasons are as distinctly marked as in Europe, and the range of temperature between the hot summers and cold winters sometimes exceeds 70° Fahr. In January and February the thermometer has recorded 100° and 102° Fahr., while the ground is covered with snow in July. In the hilly districts the glass falls at times to 17° or 16° Fahr., but such extremes are rare, and the mean range between the greatest heat and

greatest cold scarcely exceeds 20° Fahr. The most abrupt changes take place when the *minuano* (west or north-west winds) descend from the Andes, or when the *pampeiro* sweeps up from the Argentine pampas.

The precipitation is very unequally distributed throughout the year. Normally it falls in winter; but the summer rains, though of shorter duration, are heavier. Altogether the annual rainfall is estimated for the whole region at about 40 inches.*

FLORA—FAUNA.

As in the neighbouring States as far as S. Paulo, the most marked contrasts in the vegetation are presented by the woodlands and campos; but in Rio Grande the transition is in some places extremely abrupt from the herbaceous to the forest zone. Elsewhere it is more gradual, and in several districts thickets of dwarf palms (*butia rasteira*) are dotted over the grassy plains. The primeval forest, continuing the northern selva, occupies the Serra do Mar, and extends along the scarp of the mountains skirting the north side of the Jacuhy depression.

In the north and north-west the Uruguay flows through vast wooded tracts, and here is found the greatest variety of species, as well as the richest soil, so that the Upper Uruguay valley seems destined to become the most densely peopled region in the State. South of the Jacuhy the Serras do Herval and dos Tapes have also their primeval forests, but nearly the whole of the central and western regions belong to the campos zone. Southwards these almost treeless expanses assume the character of the Argentine pampas.

In Rio Grande the palm family is reduced to about ten species, including the *Jeriva* (*cocos coronata*), whose leaves wrapped round maize cobs are preferred by horses to all other food. The *araucaria* cones attract flocks of parakeets, and also serve to fatten swine. The local flora also includes various bamboos, and the *bromeliacea cravata* (*caraguata*), which resembles the pineapple. Although the valuable *jacaranda* is absent, the Rio Grande forests contain over a hundred species useful for building and cabinet-work.

Rio Grande, like Amazonia, has its apes and vampires, its jaguars and pumas ("lions"), although these are becoming rare, its iguanas, turtles and alligators. The forests are still frequented by the peccary, cutia and tapir; but the *viscacha* (*lagostomus trichodactylus*) met on the right or Argentine side of the Uruguay, is unknown on the left bank. The same river also forms a divide between other animal species, such as the anteater and coati (*nasua socialis*), which occur only on its east side.

* Climatic conditions of Rio Grande do Sul on the coastlands and in the interior:—

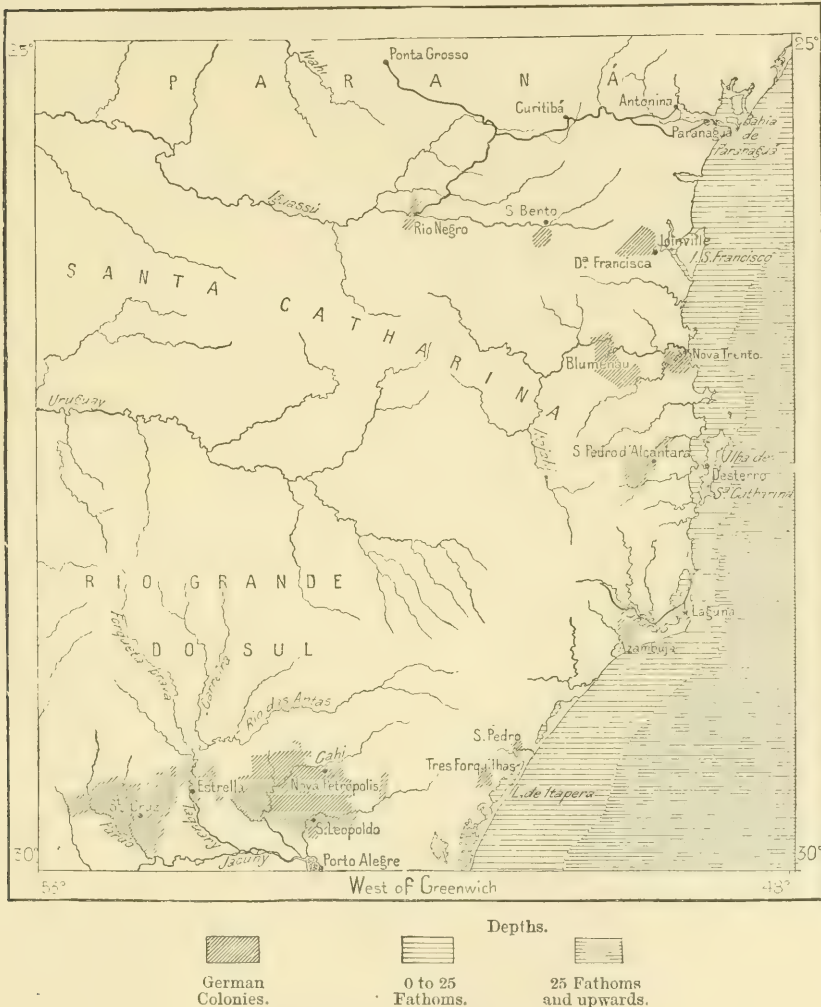
	Latitude.	Mean Temperature.	Rainfall.	Rainy Days.
Santa Cruz . . .	29° 45'	66° Fahr.	?	107
Pelotas . . .	31° 46'	63° Fahr.	42 inches	83
Rio Grande . . .	32° 7'	65° Fahr.	39 inches	80

INHABITANTS.

The exploration of the coast shell-moulds has revealed the existence of pre-historic aborigines with a type analogous to that of the Botocudos, but of an almost bestial character. A skull found near the coast south-east of Porto Alegre has heavy superciliary arches, highly projecting lower jaw, and other

Fig. 104.—GERMAN COLONIES IN SOUTH BRAZIL.

Scale 1 : 5,000,000.



traits betraying an extremely ferocious expression. But at the time of the conquest the population were exclusively of Guarani stock, and comprised numerous tribes, such as the Carijos, Patos, Minuanos, Tapes, and Charruas, most of whose names survive in the mountains, lakes, and other geographical features of the

land. But the tribes themselves have disappeared, either exterminated or absorbed in the half-caste white populations.

At most about 1,000 full-blood Indians, called Coroados or Bugres, are still found settled round the military colony of Caseros, in the north. They claim to be "Christians," without any memories of their ancestors, and living after the manner of the Gauchos. Before the emancipation the African element was represented by about 100,000 slaves. But the descendants of these negroes have also been greatly reduced, and partly absorbed in the general population.

The same process of absorption is extending to the other ethnical groups. The Germans, formerly a sixth or a seventh, are now reduced to little more than a tenth of the inhabitants, although they own one-fourth of the public domain, and monopolise half of the local industries. Nearly all the workshops and the export trade are in their hands.

The other more recent immigrants—Italians, Portuguese, Gallicians—are collectively ten times more numerous than the Germans; but being of Latin race and speech, they become assimilated far more rapidly to the general population. Stockbreeding and meat-curing being the chief pursuits, as in Uruguay and Argentina, this general population itself resembles the neighbouring Gauchos in habits and character far more than it resembles the ordinary Brazilians. Like the Gauchos, the people of all the rural districts are great riders, men of resolution, daring, adventuresome, full of resources, cruel, and accustomed to scenes of blood. During the Brazilian wars the Rio Grande horsemen took a decisive part in most of the conflicts.

Till recently the Germans comprised a sixth or a seventh of the whole population; at present they are reduced to one-eighth, or even to one-tenth, if those alone be included who habitually speak their mother-tongue. Nevertheless, they possess one-fourth of the public property, while about half of the local industry is in their hands. The German settlers in the hilly districts of the Serra da Costa (Coast Range) enjoy the largest share of national cohesion, but these are precisely the most backward in every social respect. They are not yet familiar with the Portuguese language; they preserve their old agricultural methods, and continue to dress in the old-fashioned way. On the other hand, their descendants domiciled in the towns are distinguished by their knowledge of the current languages, as well as by their enterprising and industrial spirit. They have almost a monopoly of the factories, workshops, and export trade:

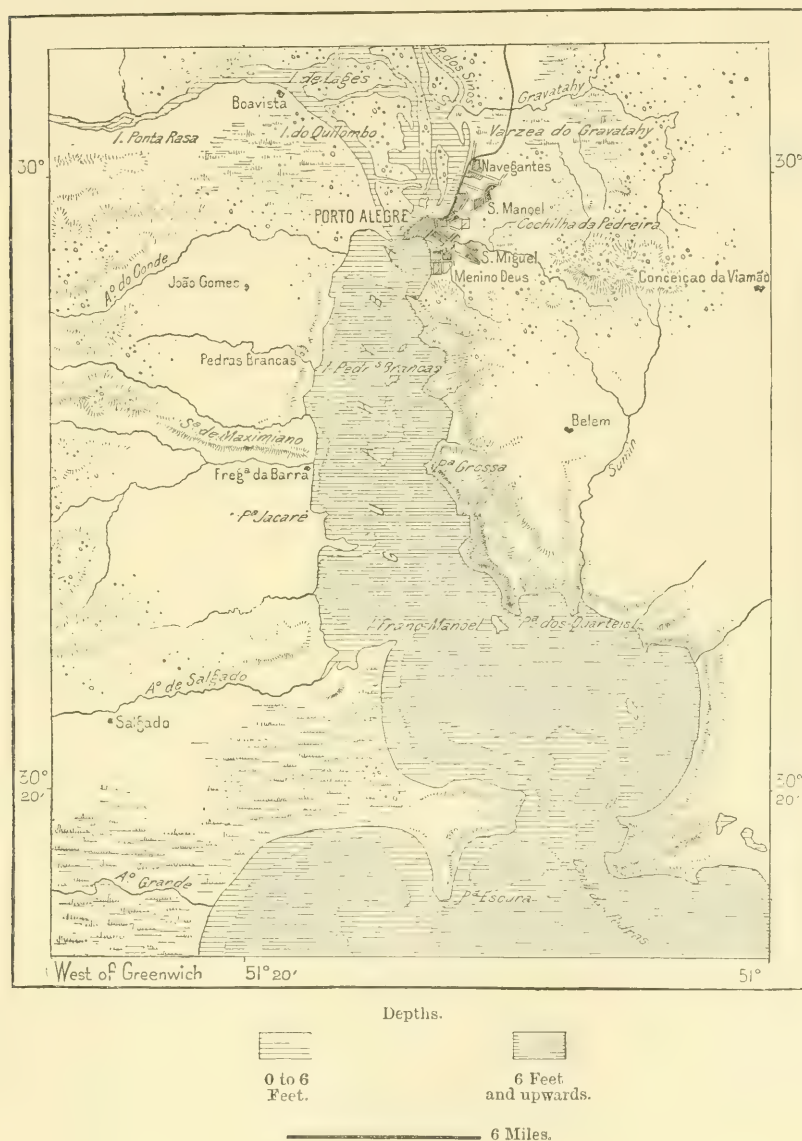
TOPOGRAPHY.

Porto Alegre, present capital of Rio Grande, occupies the true geographical centre of the country, being situated at the head of the Guahyba (Jacuhy) estuary, converging point of all the land and water highways. It stands on a picturesque headland immediately below a cluster of wooded islets, where it was founded by a few Portuguese families from the Azores in 1742, though it did not take its present name till 1773. Its prosperity dates from the time when the German

settlers on the Serra da Costa made it a depôt for their agricultural produce. To this occupation it has now added other industries, such as cigar-making, brewing, and ship-building. As the strategical centre of the southern states, the Brazilian Government has made it the seat of a military school.

Fig. 105.—PORTO ALEGRE AND GUAHYBA ESTUARY.

Scale 1 : 450,000.



Porto Alegre may also be considered a sort of literary and scientific centre, thanks to its numerous colleges and periodical publications. A little to the west near the south bank of the Jacuhy, are situated the *S. Jeronymo* coal mines, which have a yearly output of about 2,000 tons. They lie in a carboniferous zone,

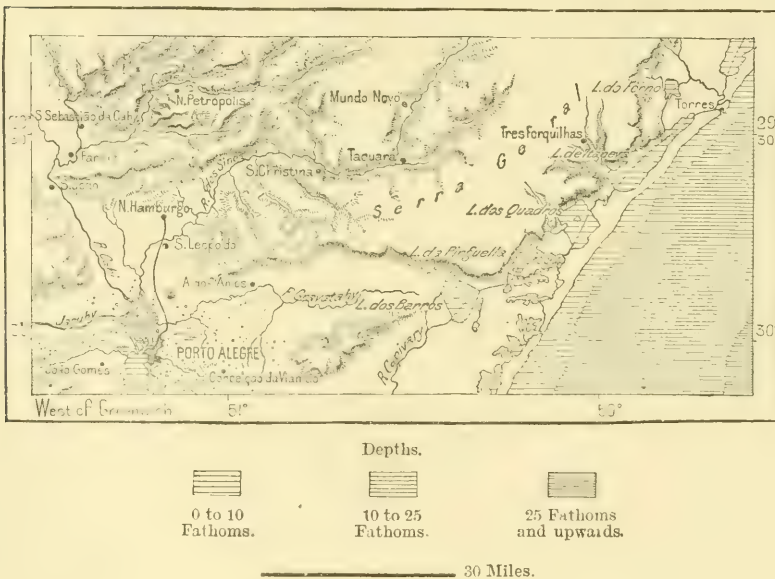
which extends north-east and south-west parallel with the coast between the *Tubarão* and *Jaguarão* coalfields.

The natural trade route of the river is completed above *Taquary* by a railway, which penetrates by the industrial towns of *Rio Pardo* and *Cachoeira* westwards to the *Ibicuy Grande* basin. Another line running northwards to *S. Leopoldo* and *Nova Hamburgo* (*Hamburger Berg*) connects all these German settlements with their natural market of *Porto Alegre*. The navigable waters of the lake stretching southwards puts the capital in direct communication with *Pelotas* and *Rio Grande*, this waterway being accessible to craft drawing eight or nine feet.

But being prevented by the dangerous bar at the mouth of the *Rio Grande* from developing its foreign trade, *Porto Alegre* proposes to seek another seaward

Fig. 106.—PROPOSED CANAL FROM THE CAPIVARY TO TORRES AND LAGUNA.

Scale 1 : 2,000,000.

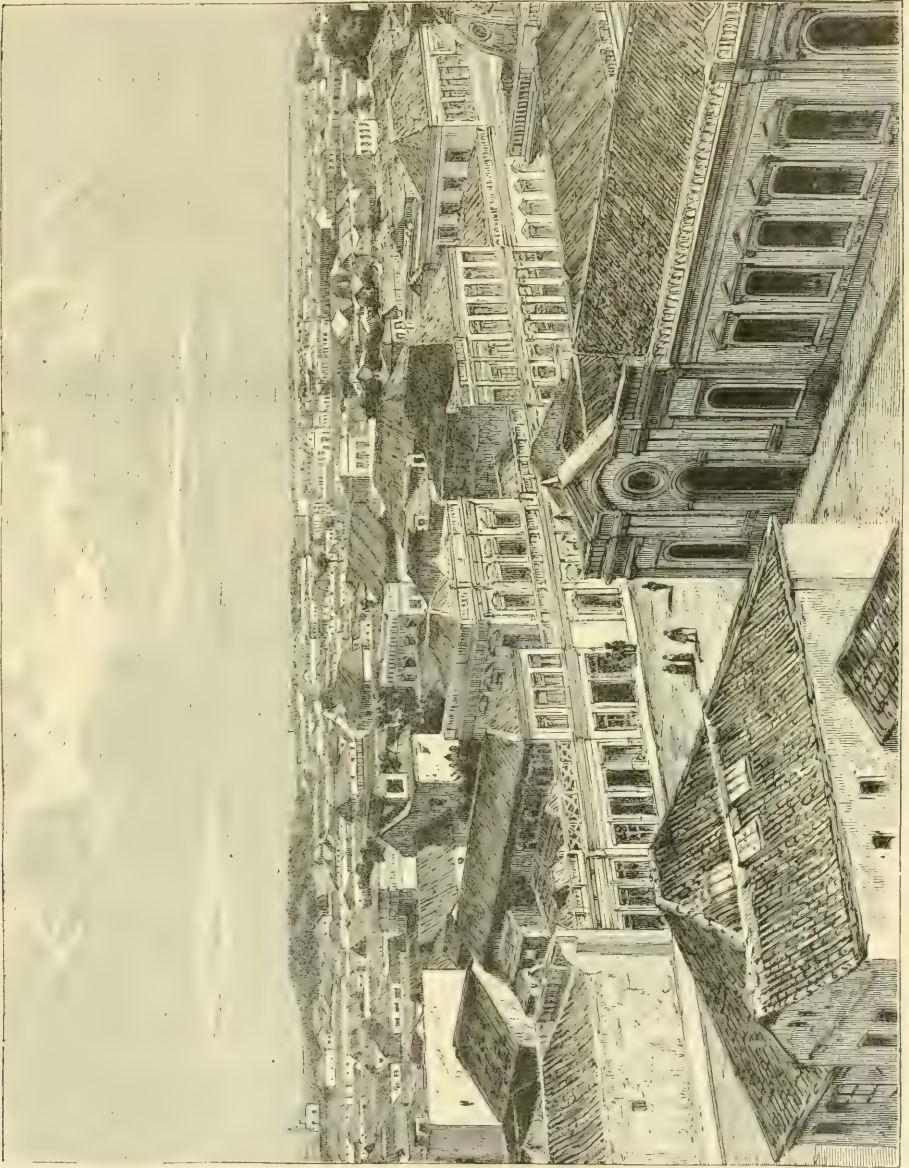


outlet by utilising the chain of lagoons which extend from the *Lagoa dos Patos* north-eastwards to the *Tubarão* lagoon. The projected canal is to run from *Capivary Bay*, touching about midway at the port of *Santo Domingos das Torres* on the *Santa Catharina* frontier. But *Torres* itself, being exposed to every wind, would have to be protected by costly harbour works, including long piers and breakwaters, beyond the present resources of the State. The engineers have also proposed to cut through the isthmus which shelters the *Lagoa dos Patos* on the east, and to construct an artificial harbour at the extremity of the cutting.

Jaguarão, at the other end of the fluvial basin, abuts on a high hill which commands an extensive prospect. Founded in 1763 by some colonists from *Madeira*, *Jaguarão* has taken an active part in all the local wars and revolutions. At present it trades with the neighbouring republic through its suburb of *Artigas*,

on the Uruguay side of the river. But in this district the chief market is *Pelotas*, on the left bank of the Rio S. Gonçalo near its mouth in the Lagoa dos Patos. Of all Brazilian towns Pelotas does the largest business in the *carne secca* ("dried meat") industry. Here are annually slaughtered over 300,000 oxen (in 1890 as

Fig. 107.—Rio Grande—GENERAL VIEW.



many as 400,000), the jerked meat being exported chiefly to Rio, Bahia, and Pernambuco. This trade represents an average annual sum of about £1,200,000, exclusive of the offal used in the manufacture of soap, candles and manure.

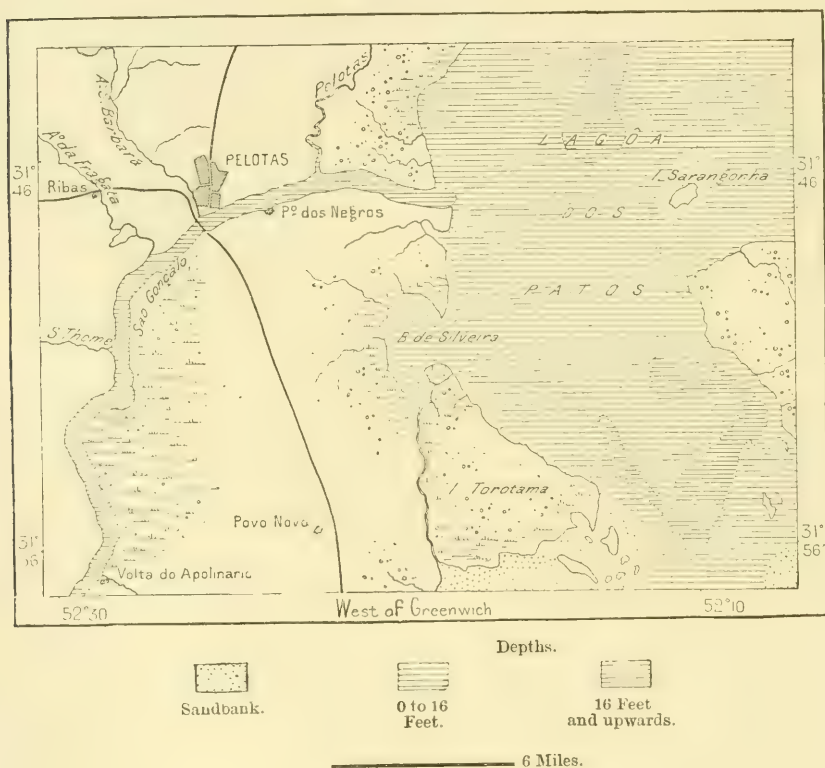
Facing each other on the banks of the Rio Grande emissary of the Lagoa dos Patos stand the two cities of *S. José do Norte* and *Rio Grande do Sul*, here

"Norte" and "Sul" being misnomers for "East" and "West." Rio Grande, former capital of the province named from it, occupies the extremity of a narrow isthmus between two lagoons, and would present a pleasant aspect but for the unsightly military structures, dead walls, and forts by which it is disfigured.

The lacustrine channel flows at some distance from the peninsula, close to the side occupied by S. José do Norte, where all the shipping engaged in trade has its moorings. A more serious inconvenience is the bar of shifting sands, which it has hitherto been found impossible to fix or permanently remove. On the sill the depth varies with the tides and storms from about 8 to nearly 14 feet. It

Fig. 108.—PELOTAS.

Scale 1 : 375,000.



stood at 11 feet in 1885, when a new channel was opened farther south averaging 15 feet, but rising with the north-east and falling with the south-east wind.

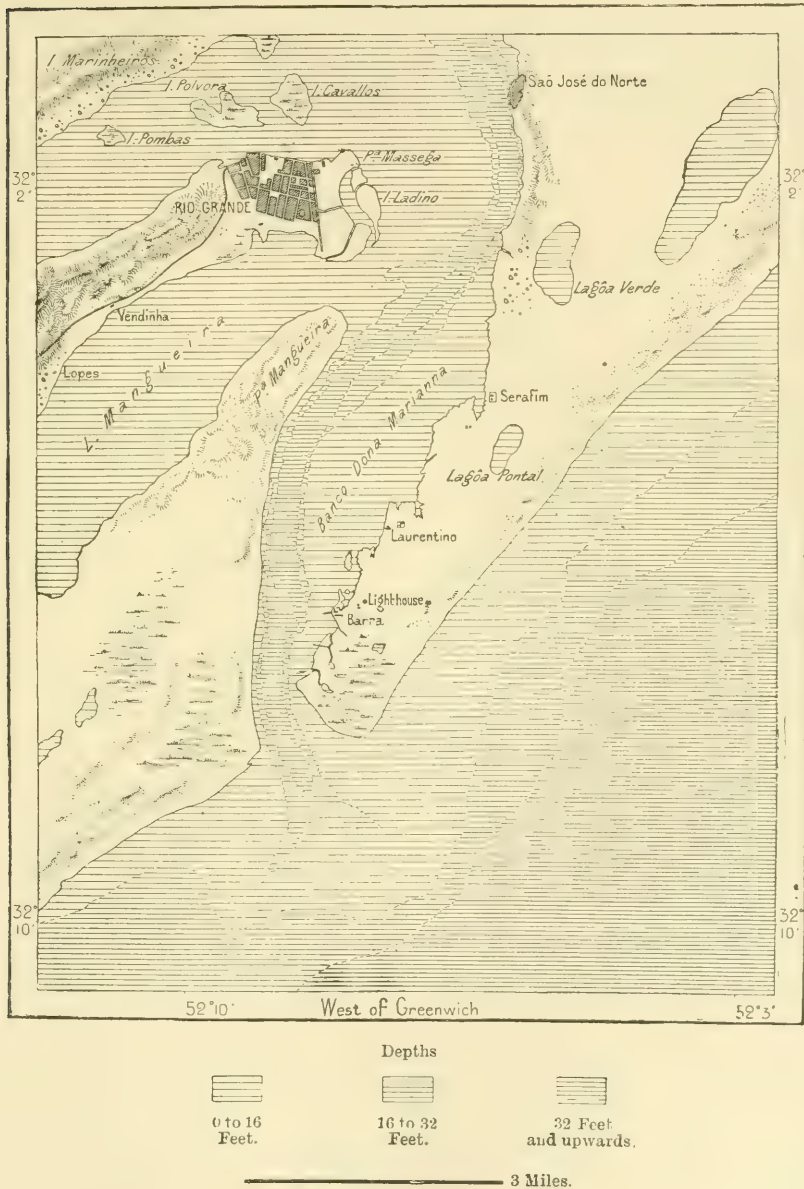
The works which have been projected to improve the approaches to Rio Grande comprise two parallel piers carried out to depths of 18 or 20 feet, and the construction or dredging of a channel between these piers 1,300 feet wide and 26 or 27 feet deep. But pending the execution of these harbour works, the export trade of Rio Grande, consisting almost exclusively of provisions, is declining. Commerce naturally seeks other outlets, which have at least the advantage of avoiding the dangerous approaches to Rio Grande. The opposite town of S. José is entirely

engaged in the cultivation of onions, the only plant that thrives in the sandy soil of the district.

The railway connecting Rio Grande do Sul with Pelotas is continued west-

Fig. 109.—RIO GRANDE DO SUL AND ITS BAR.

Scale 1 : 150,000.



wards along the Uruguay frontier to the town of *Bagé*. This place lies near the ancient *Santa Tecla* within the basin of the Rio Negro, which flows almost entirely in the territory of Uruguay. The neighbouring hills abound in lead, copper and

gold, and at some points the railway between Pelotas and Bagé traverses coal fields of bad quality. The gold mines of *Lavras* have been worked since 1835.

In the upper Uruguay basin the only places of any note are *S. Borja*, formerly a famous mission founded by the Jesuits in the midst of the Guarani Indians; Itaquy, nearly opposite the Aguapey confluence, with a Government arsenal on the Argentine frontier; *Uruguayana*, riverside port of *Alegrete*, chief town of the Ibicuy basin. In the war with Paraguay, Uruguayana was the scene of a memorable event. It was seized in 1865 by 5,000 Paraguayans, who had to capitulate after undergoing a formal siege by three of the allied armies commanded by the Emperor dom Pedro in person. Almost every town in Brazil has a street, square, or promenade bearing the name of Uruguayana in memory of this doughty exploit.





CHAPTER XIII.

MATTO GROSSO.



WITH the exception of a narrow central zone, the vast region of Matto Grosso, that is, the "Great Forest," nearly five times the size of the British Isles, is a mere wilderness with undefined limits, and, if not actually unknown, at least abandoned to the aborigines and wild beasts. With the rest of Brazil it is connected only by the tracks of hunters, or the course of the navigable waters rising within its borders. Its very name has no distinct geographical meaning, for the expression is applied to many distinct regions, which belong only in small measure to the Amazonian selva. Most of the territory is in fact comprised in the zone of uplands which form the waterparting between the great northern and southern basins, and which are overgrown not with forest trees but with stunted scrub and bush.

Another section consists of the partly dried bed of an old inland sea, whose shores are thinly wooded. The whole of the civilised population is less than that of a single suburb of Rio de Janeiro, and in an area of some 530,000 square miles the inhabitants, settled and savage, fall considerably short of 200,000. Yet no other country exceeds certain parts of the Brazilian wilderness in fertility, and within its borders there is certainly ample space for a population of at least 100,000,000.

HISTORIC SURVEY.

Except in the extreme south and west, Matto Grosso remained unvisited by the Spanish conquerors, who, after establishing themselves in Peru and in the Plate estuary, made no serious attempt to connect these two sections of their prodigious domain, or at least limited their efforts in this direction to the exploration of the Upper Paraguay and of the Bolivian plateaux.

Hence the Paulist kidnappers were the first whites to penetrate into Matto

Grosso. Towards the year 1680 a certain Manoel de Campos had already visited the Bororo Indians on the southern slope of the plateaux, and he was followed by other traders. The discovery of gold suddenly increased the number of these pioneers, and every year convoys, sometimes comprising hundreds of *bandeirantes*, set out for this "Promised Land," where, according to report, gold dust was collected by the bushel. But no proper tracks were laid down, and the adventurers, exposed to the attacks of the Indians, with no supplies except the products of the chase and the fisheries, had often to abandon the sick, the feeble, and the wounded to the wild beasts or to the wilder natives. At times whole convoys disappeared, not a soul escaping, and no permanent settlements could be established in these boundless solitudes, where distances were measured, not by miles or ordinary leagues, but by the *legoa grande*, averaging from four to five miles.

To reach the mines of Cuyaba, where is now the capital of the State, the gold hunters first followed the Rio Tieté and the Parana to the Pardo confluence, then ascended the Pardo to its Anhambuhy affluent, thus reaching the Serra de Santa Barbara and the Campos de Vaccaria. Thence their goal was reached by the Rios Miranda, Paraguay, and Cuyaba, the journey occupying many long months.

The Mineiros, rivals of the Paulistas, in their turn reached Matto Grosso by the more direct route across Goyaz and by the valley of the Rio das Mortes. But the mines, as badly worked as elsewhere in Brazil, gradually ceased to attract adventurers, and Matto Grosso had almost been again forgotten, when the era of scientific exploration was ushered in by D'Orbigny, Castelnau, D'Alincourt, and Leverger. Then, after the Paraguay war, various commissions were successively appointed to survey this outlying dependency of Brazil.

Up to that time Matto Grosso had remained within the commercial sphere of the port of Santos in the land of its first discoverers; but the traffic on this long and costly route was of trifling value. So difficult were the communications, that on the declaration of war, it was found impossible for troops to be despatched from the seaport directly to the aid of the people of Matto Grosso threatened by Paraguay. The expeditionary force of 3,000 men, which left Rio de Janeiro in April, 1865, did not reach Uberaba in the Upper Parana basin till the following July. Thence it set out across the solitudes, losing one-third of its strength before reaching Miranda, near the Paraguayan frontier, nearly two years after starting from Rio. Failing to receive the supplies it had expected at the Rio Apa, the little band had to fall back in the face of the enemy, and not more than 700 eventually succeeded in reaching a place of safety within the Brazilian lines. All the rest had perished of fever, cholera, wounds, and hardships of all kinds.

But the ultimate triumph of Brazil over Paraguay opened all the main routes of access to Matto Grosso, and a regular line of steamers was established to ply between Rio de Janeiro and Cuyaba, by the La Plata, Paraguay and Cuyaba rivers. This route, however, was also too long and too costly for trade purposes, the best boats taking not less than thirty-one days for the voyage.



MATTO GROSSO SCENERY—BANKS OF THE AQUIDAUANA.

The alternative fluvial route by the Amazons, Madeira, and Guaporé is even less used than it was in the eighteenth century, after the exploration conducted in 1742 by Manoel de Lima. The few travellers who venture to descend the Guaporé in boats have to surmount long portages before reaching Santo Antonio at the head of the steam navigation on the Madeira. On the other hand the direct route from Para, by the Amazons, the Tapajoz, and the Juruena, is too tedious and difficult to be utilised by commerce. It is used only for the importation of the guarana bean (*paullinia sorbilis*), which is collected by the Mauhé Indians on the banks of the Amazons, and also imported by the Madeira route. When ground to a powder, and mixed with water, this bean makes a beverage preferred by the people of Matto Grosso to all other drinks.

Nevertheless Matto Grosso is being gradually drawn closer to the rest of Brazil. A telegraph line has already been established between Rio and Cuyaba, while the railway by S. Paulo has advanced beyond the Rio Grande, thus covering over a third of the total distance between Cuyaba and the coast.*

Extensions of the existing routes are being planned in all directions, and the steam traffic of the navigable waterways is being developed, while the rivers themselves are being connected by lateral highways across the intervening steppes and forests. Thus the two rivers, Ivahy and Paranapanema, traversing the States of Parana and S. Paulo, are to be continued beyond Parana by following the course of the Ivinheima, and of the Brilhante as far as the uplands in the neighbourhood of Miranda, in South Matto Grosso. Such communications, however, are far from sufficient to meet the requirements of a large stream of immigration, whenever it sets in the direction of these magnificent regions about the Paraguayan and Amazonian divides and slopes, regions which have every prospect of becoming a great centre of population in the near future.

The first movement of colonisation will most probably be made by the southern route from the direction of Paraguay and Argentina. Of the present scanty population of Matto Grosso, the great majority is concentrated on the southern slopes. With the exception of a single town and its environs, the whole of the territory draining north to the Amazons still remains unoccupied and uninhabited, except by a few scattered Indian tribes.

PHYSICAL FEATURES.

Matto Grosso is one of the least hilly regions of the continent, and although the natives reckon their "serras" by the dozen, there are nowhere any heights constituting real mountain ranges. All the East Brazilian uplands fall gradually west of South Goyaz, and the space between these highlands and the Andean foothills was at one time traversed by a marine strait, separating the two great Alpine regions of East Brazil and the Cordilleras. Fluvial waters now flow in this marine depression which has been largely filled by their alluvial deposits.

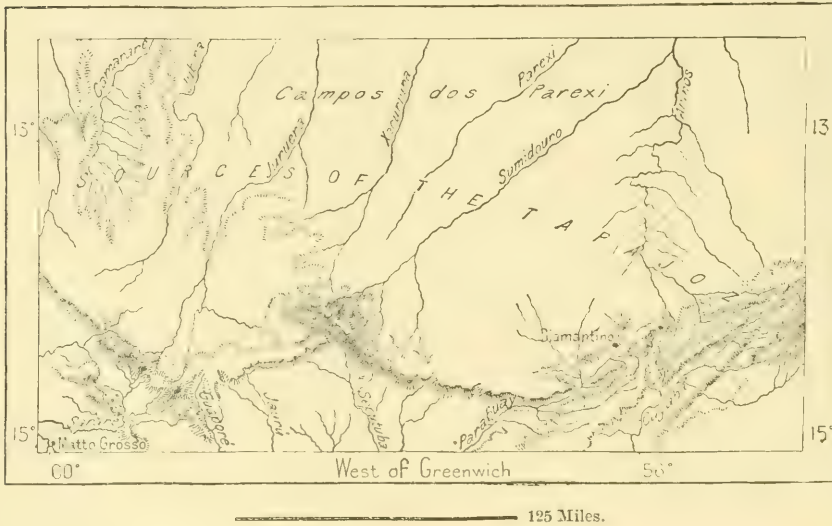
* Distance in a straight line from Rio de Janeiro to Cuyaba, 880 miles; by the Buenos Ayres route, 3,840 miles.

The divide between the sources of the Guaporé and the headwaters of the Paraguay scarcely exceeds 1,650 feet in altitude, and the Brazilian uplands appear to be connected with those of the Chiquitos territory only by a very narrow isthmus of ancient rocks. Here is the true geographical centre of South America.

On the maps a continuous chain of mountains is traced between the Madeira and Tapajoz basins, then between the Tapajoz and Paraguay, and lastly between the Tapajoz and the Araguaya. Yet it is certain that this semi-circular ridge has but a fragmentary existence. The heights dominating the plains of the upper Paraguay and its affluents are in reality merely the escarpments of a plateau disposed in horizontal or very slightly inclined strata, and eroded by the streams now descending towards the Amazons. The rampart itself has a mean

Fig. 110.—TAPAJÓZ AND PARAGUAY WATERSHED.

Scale 1 : 5,500,000.



elevation of no more than 1,650 feet, and above the edge of the plateau rise a few isolated crests, attaining here and there a height of some 3,000 feet.

Thus the orographic system of the Matto Grosso watershed, indifferently called "cordilheira" or "campos" dos Parexi, from the local Indian tribe, presents a mountainous aspect, only as seen from the south. On this steep side the face of the escarpments is carved into rocky walls, sharp peaks, or needles. But on the opposite side, facing the Tapajoz and Xingu basins, nothing is seen except a long gently-inclined slope gradually merging in the Amazonian plains.

The southern parts of the *Araxá*, as the edge of the plateau is generally called, date probably from paleozoic times, and here are represented carboniferous, devonian, and silurian formations. Farther north, in the zone of cataracts traversed by the Madeira, Tapajoz, Xingu, Tocantins, and their affluents, the rocks exposed by the erosions of these streams are all of crystalline character—granites, gneiss, porphyries, and quartzites.

Farther south, between the sources of the Paraguay and those of the Araguaya, and also between the Paraguay and the Parana, the uplands have been eroded both on the east and the west, so that in some places the intervening heights assume the aspect of real mountains, disposed in the direction from north to south. Such are the Serra de S. Jeronymo, and the Maracaju and Anham-baby ranges. Eruptive rocks, locally called basalts, have here cropped out above the prevailing sandstones, and to their decomposition appears to be due a "red earth" analogous to that which yields the coffee growers such splendid returns in S. Paulo.

Within the cirque-like space enclosed by the semi-circular range of heights, the surface is broken by a number of rocky isolated masses, which are visible from a great distance, and which are stratified with perfectly regular layers. The heights themselves affect, for the most part, geometrical forms, as if vast slabs of rock had scaled off, leaving smooth surfaces like the sloping sides of a finished pyramid. The summits, as horizontal as if the crests had been cut away by a sharp instrument, correspond to other summits of like formation, so that all evidently at one time formed part of a continuous terrace.

From the disposition of the lines of disintegration round the flanks of the hills, a conjecture may be hazarded as to the direction likely to be followed in the process of destruction still going on. According to de Taunay, who resided several years in the district, and traversed it in all directions, these sandstone masses, with their perfectly regular horizontal series of stratification, consist of lacustrine sedimentary matter sifted and distributed by the great freshwater lake, which formerly covered the whole region.

The detritus washed down from the surrounding slopes and escarpments has also had its share in modifying the general aspect of the land. This detritus, accumulating in the form of talus at the base of the hills, has been caught up and redistributed by the running waters, in some places covering the ground with fresh matter to a great thickness. Mountain masses formerly connected with the inland plateaux and ranges, now appear completely isolated, because their base is concealed by the accumulated débris, so that they rise abruptly above the surface without any transitional talus formation. These isolated masses, which have received the name of *itambé*, like the great mountain of the serra d'Espinhaço, near Diamantina, shoot up in peaks and domes above the surrounding woodlands, looking from a distance like colossal structures raised by the hand of man.

In the eastern districts of South Matto Grosso, the heights belonging to this geological system are disposed in ranges or grouped in archipelagoes, standing out above the sea of verdure. In the direction of the west they become continually less elevated and less numerous, or else appear completely isolated within the circle of the horizon, though still extending in solitary groups all the way to the right bank of the Paraguay, and even reappearing on the opposite side. As already remarked by d'Orbigny, the Chiquito heights belong rather to this Brazilian system than to that of Bolivia.

RIVERS:—THE PARAGUAY SYSTEM.

The Upper Guaporé, the Itenez of the Bolivians, although comprised within the Amazons basin, as an affluent of the Mamoré, belongs specially to Matto Grosso, for the town of this name has been founded on its banks, and nearly the whole of the settled population of the State is centred in the depression, the western section of which is traversed by this river. The Guaporé, so named from a long extinct Indian tribe, has its chief source in a *corixa* or grotto on the edge of the Araxa escarpment, and flows at first in the direction of the south parallel with the other streams descending to the Paraguay. But after escaping from the last hills the ferruginous torrent trends round to the west and north-west, and after receiving numerous affluents, traverses the plain in which is situated the town of Matto Grosso, 160 miles from its source. Six miles lower down a bridge spans the stream, which presents great difficulties to the navigation, being much obstructed with snags and shifting sandbanks.

The Paraguay, either the "Parrakeet River," or more probably the "River of the Payaguay Indians," is one of the most remarkable navigable water-courses in the world. Few streams have a more gentle incline in proportion to the length of their course. Leaving out of consideration the headwaters which escape through numerous rapids, and even cascades from the hilly districts, the point where the Paraguay begins to flow in a tranquil stream stands at an elevation of not more than 660 feet above the sea, from which it is still distant 2,500 miles. Hence the mean incline cannot be more than about three or four inches per mile. Steamers of light draught are thus able to penetrate from the ocean up the mainstream and its numerous affluents—Jauru, Sepotuba, Cuyaba, S. Lourenço, Taquary—far beyond the Argentine and Paraguay republics into the very heart of Brazil.

Another remarkable phenomenon is the intermingling of its farthest headstreams with those of the Amazons affluents. The Jauru, former frontier stream between the Spanish and Portuguese possessions, approaches so near to the Guaporé that it was found easy to connect the two systems by an artificial canal. The Aguapehy affluent of the Jauru is separated from the Alegre, which joins the Guaporé near Matto Grosso, only by a narrow isthmus of slight elevation, and not more half a mile wide. In 1772 a canal was cut through the divide, large enough to admit a six-oared boat, and other attempts to establish a permanent communication between the two waterways have failed only through the lack of sufficient traffic to support such works.

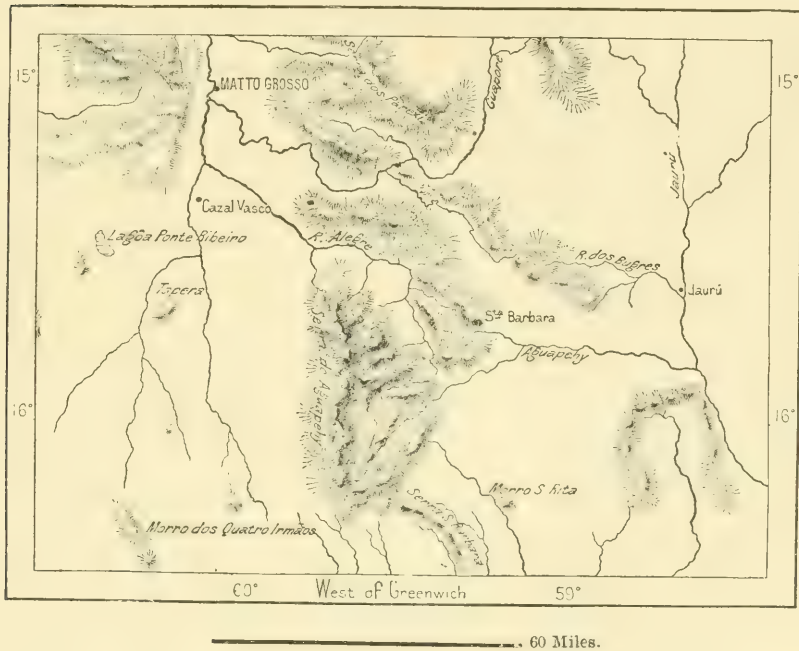
Below its headstreams, the Paraguay flows through a marshy district at the foot of the plateau, where its limpid waters expand into a series of lagoons overgrown with aquatic plants. Here and there its course is confined between hills, but it soon enters the vast plain which was formerly a flooded depression, and still partly retains its lacustrine character. During the floods, when the Paraguay and its tributaries rise 35 or 36 feet, the overflow with its islands and archipelagoes of floating vegetation, expands to a temporary sea stretching beyond the

horizon, and continued on the rising grounds by the so-called *banhados*, or "drowned lands." Above these rise thickets of tall herbs and shrubs, and in some places artificial mounds, where the natives formerly took refuge during the inundations.

Lake Xarayes, as this expanse was called by the first Spanish explorers, stretches for a length of about 360 miles north and south between the mouths of the Jauru and the Fecho dos Morros hills, and in some places has a width of 250 or 260 miles. Although it is not permanent, as was formerly supposed, certain stretches locally called *bahias*, the "bays" or inlets of the old inland sea, are flooded throughout the year. Most of these basins communicate at all seasons

Fig. 111.—SOURCES OF THE ALEGRE AND AGUAPAHY.

Scale 1 : 2,500,000.



with the Paraguay, either through lateral creeks or broad passages. Such are lakes Uberaba, Gaiba, Mandioré, and Caceres, which swarm with "hundreds of thousands" of the Jacaré crocodile. Some are freshwater basins fed exclusively by the river; but others are old depressions formerly filled by the marine waters, and still preserving saline incrustations which give them a brackish taste.

Towards the centre of the great depression the Paraguay is joined by the Cuyaba, with its S. Lourenço tributary, called also the Rio dos Porrudos from the Indians of that name, who protected themselves with a kind of sack from the bite of the voracious piranha fish. Below the confluence these waters still wander over the level plains in a labyrinth of creeks, channels, false rivers, and lateral branches all the way to the junction of the Taquary and Miranda, descending

from the eastern uplands. In its upper course the Taquary is joined by the Coxim, described by all travellers as one of the most romantic streams in Brazil. The Miranda, itself a lovely river, is also joined by a picturesque affluent, the Aquidauana, or Mondego, which the Paraguayans claimed as the northern limit of their territory. Descending from the Amambahy heights, it winds in long meanderings between wooded banks to its junction with the Miranda at the entrance to the marshy plains of Lake Xarayes.

From the western or Chiquito side the Paraguay receives only one important affluent, the Tucabaca or Oliden, which, after its junction with the San Rafael, develops a chain of lagoons much obstructed by dense masses of drifting vegetation. The Otuquis, spoken of by D'Orbigny as affording a convenient navigable route from the Argentine plains to Bolivia, was ascended in 1854 in the *Water Witch* by Page a distance of 34 miles, when he had to return, not for lack of depth, but because he was unable to force a passage through the dense floating vegetation. In 1886 Fernandez reached a point 25 miles farther, when he also had to return for the same reason. Were its discharge regulated, and its current kept clear of aquatic plants, the Otuquis might probably become an outlet for the trade of Bolivia. South of the Bahia Negra confluence, the section of Gran Chaco included in the territory of Paraguay begins on the right bank of the river. But on the left side, the Brazilian frontier is not indicated beyond the confluence of the river Apa, 155 miles farther south.

CLIMATE.

The inhabited parts of Matto Grosso, lying in the heart of the continent in a sort of trough between the Andean and Brazilian highlands, present peculiar climatic conditions, characterised especially by a very high mean annual temperature, higher even than on the banks of the Amazons under the equator. At the same time the oscillations of the thermometer are far more abrupt than in other tropical regions, amounting at times to as many as 28° and even 33° Fahr., in the space of twelve hours. These sudden changes are due to the winds veering round from north-west to south-east; or in the reverse direction from south-east to north-west. Thus the moist currents from the Amazonian selva are often suddenly replaced in winter by cold currents from the Argentine pampas.

On the uplands the glass falls at times to freezing point, and wayfarers have often perished of cold in crossing the Araxa range. In March, 1822, that is, at the end of summer, a caravan from Rio de Janeiro lost over twenty negroes in the Rio Manso valley west of Cuyaba.*

The rainfall, regular in summer and frequently accompanied by thunderstorms, has not yet been accurately gauged, but appears to average at least 120 inches.

* Meteorological conditions of Cuyaba :—

Temperature.			Rainfall.	Rainy Days.
Mean.	Max.	Min.		
79° Fahr.	106° Fahr.	45° Fahr.	45 inches	85

In general the conditions are highly unfavourable for Europeans, at least, on the low, marshy plains. The relatively salubrious plateaux are not yet comprised within the settled districts, so that nearly all strangers have to face the dangers of great heat and moisture on the low-lying plains. These regions have been visited by frightful epidemics, measles in the last century, and since then other scourges such as small-pox and yellow fever. Hence, despite a high birth-rate, the population in some years has diminished in the rural districts. In Matto Grosso the great epidemics have attacked the animals with as much intensity as human beings, and have even spread from the cattle and poultry to the deer, tapirs, and jaguars of the forests and savannas. In 1857 nearly all the horses and mules perished in the southern districts between Miranda and Cuyaba, and since then, the horned cattle, estimated at from 600,000 to 1,000,000, have become half wild through the lack of mounted herdsmen to tend the droves.

FLORA—FAUNA.

About the watersheds of the great basins the Amazonian and Argentine vegetable and animal kingdoms are intermingled. Nevertheless, the tropical flora with its endless variety of forms predominates in all the wooded regions, that is, mainly along the river banks. Nowhere else have trailing palms acquired a more remarkable development. The urubamba (*calamus procumbens*), a member of this group, grows to a length of over 650 feet, with a stem scarcely half an inch thick. The cotton shrub grows wild on the plains, and another useful indigenous plant is the ipecacuanha, locally called *poaya*. The American ostrich has penetrated from the campos and pampas into the Upper Paraguay plains, and the low marshy grounds have favoured the development of huge land and water boas.

INHABITANTS.

In Matto Grosso the decrease of the aborigines has been more rapid than the growth of their white successors. The tribes, which at the arrival of the Europeans ranged over the whole region, have been greatly reduced, and vast districts may now be traversed without meeting a single Indian. Although the distinct groups are still reckoned by the dozen, the collective population does not certainly exceed 25,000.

The Parexi or Parecis, about the headwaters of the Tapajoz, one of the best-known groups, are affiliated by Ehrenreich to the Arawak family, and by D'Orbigny to the Pampas Indians, while Martius regards them as a distinct race. Since the arrival of the miners they have entered into friendly relations with the settlers of Portuguese speech, and by crossings have become partly assimilated to the Brazilians. They have even been baptised, and therefore pass as Christians. After the discovery of the mineral deposits they were employed as *garimpeiros* by the gold and diamond hunters; but at present they are sent into the forest in

search of ipecacuanha and other medicinal plants. Skilled weavers and workers in straw or fibre, they make excellent baskets, panniers, textile fabrics, hammocks, and various other objects, which they sell to the settled populations of the plains.

A more savage people are the Bororos, who formerly occupied the Upper Jauru and Cabaçal valleys, but who are now stationed on the banks of the S. Lourenço, in the colony of Thereza Christina. These rude natives, who add to their fierce expression by daubing the face red and slitting the lips, are firm believers in the transmigration of souls. They regard themselves as the brothers of the parakeets, who are never killed; but the vultures receive the souls of departed negroes, while great sorcerers pass into the bodies of bright coloured fishes. Shooting stars are supposed to portend the death of some member of the tribe.

The central parts of Matto Grosso at the foot of the plateaux are occupied by the Guatos, some of whom are still in the wild state. They are physically a fine race, resembling Europeans more than the other aborigines. Formerly they wore a lip ornament like that of the Botocudos, and still deck themselves with necklaces of jaguar and crocodile teeth, but dispense with all clothing except in the neighbourhood of the white settlements. The Guatos, whose name appears to mean "Watermen," are unrivalled boatmen, passing a great part of their existence on the lakes and rivers, and living chiefly on the jacaré crocodile and wild rice. To this diet is attributed the odour of musk which they emit. The Guatos are so expert in taming wild animals and birds that they seem to have the power of charming them. Although nominal Christians, they are said still to gather in sacred places, especially the summit of the Serra de Dourados and the islands of Lake Uberaba.

Although of different speech, the Guanés of the Taquary and Miranda Valleys are, perhaps, akin to the southern Guaycurus. At present they are little better than serfs, employed by the white settlers to collect drugs, build boats, plant manioc, beans, bananas, and the sugar cane. They also distil rum, and weave a cotton fabric of such close texture as to be perfectly waterproof. In these *pannões*, as they are called, the warp is completely concealed by the weft.

The Guanés no longer paint their bodies, mutilate their ears and other members; but none of these practices had fallen into abeyance before the second half of the present century. Till recently, the Laianos, a sub-tribe dwelling in the vicinity of Miranda, covered the whole body with white, red, or black paintings, executed with remarkable delicacy. Some of the designs represented various animals, to which the artist endeavoured to impart a fierce look, doubtless in order to terrify the enemy. They worshipped the constellation of the Pleiads. The Guané language is extremely soft, but without any energy, and every sentence usually terminates in a prolonged sound, which, to strangers, resembles a groan. The Guané is evidently not the language of a free people.

In the southern districts, near Paraguay, dwell various tribes who have received the collective name of Guaycuru, a term said to mean "Runners." They are the same people whom the Guarani called Mbaya, "Terrible," or "Bad," and to whom



LENGOAS INDIANS ON THE MARCH.

the Spaniards gave the name of Lengoas, "Tongues," from the distension of the lower lip by the insertion of a disk, giving it the appearance of a second tongue. They constituted one of the largest nations in South America, and even still far outnumber all other natives of the Paraguay basin except the Guarani.

Yet according to Severiano da Fonseca, the Cadiueos or Beaqueos, as they are now commonly called, are already reduced to no more than 1,600, although a few years after the declaration of independence they could muster as many as 4,000 fighting men. At that time they still tattooed and painted themselves in vivid colours, and shaved the crown of the head like the Coroados of the eastern provinces. The women use many words in conversation which do not occur in the speech of the man. This double language probably originated in the custom of bride capture.

Another designation of the Guaycurus is that of *Caballeros*, "Cavaliers," which is well merited since the introduction of the horse three centuries ago. They show as much skill in the saddle as the Argentine Gauchos themselves, and during their migrations from one camping-ground to another, the women mount the pack-horses perched on the loads. The Guaycuru horsemen were long dreaded for their method of attack, resembling that of the Arab bedouins in its swift advance and retreat. On the rivers they were also formidable combatants, using oars tipped with spear-heads, so that the same implement served to pursue the foe, to strike and retire. Hundreds of Europeans have perished in the wars with the Guaycurus, whose type has been greatly modified by the large number of women captured from the white settlers during the last three hundred years. At present many, especially in the Corumba and Albuquerque districts, live on friendly terms with the Brazilian population, to which they are being gradually assimilated.

In a quiet self-satisfied way the Guaycurus regarded themselves as the first nation in the world. They tolerated no intercourse with strangers, except to receive their tribute and recognition of inferiority. All the other Indians living in their territory had been reduced to a state of servitude, and even now the Guanés bend the neck to a sort of slavery under the whites, for the sole purpose of escaping from a harder fate as subjects of their Guaycuru kindred.

But even in the Guaycuru social system itself, everybody is not equal. The community, constituted by force, is divided into three perfectly distinct classes, the *joagas*, or nobles, the plebeians, and the slaves. The daily life of every member of the tribe has been strictly regulated by this division into three irreducible castes. Thus the nobles can only marry "ladies of high birth" who bear the title of *dona*, although they are permitted to choose concubines from the lower castes. The slaves, descendants of captives in war, can never be emancipated under any circumstances. Even the very tents, which the Guaycurus carry about on their wanderings from place to place, are all arranged in accordance with the laws of precedence. Great homage is paid to a noble at his death; in his grave are deposited his bow, arrows, lance, and martial adornments, and by his side is killed his favourite steed.

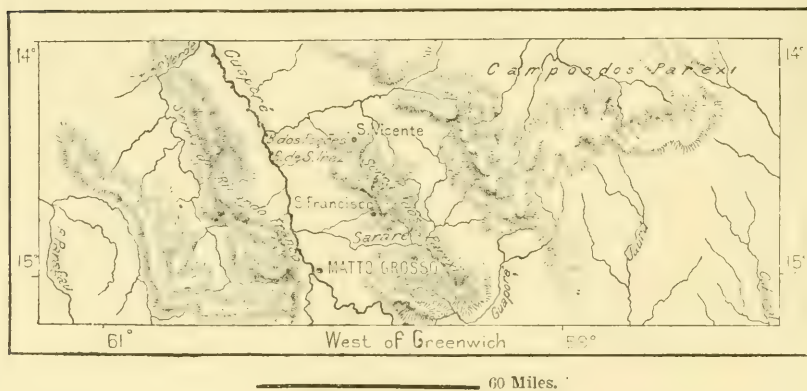
Like that of Goyaz and Minas Geraes, this Brazilian population of Matto Grosso consists in great measure of Paulistas, who, thanks to their almost complete isolation, have better preserved the old Portuguese usages than elsewhere. The womenkind are still carefully secluded, and the host seldom introduces his wife and daughters to visitors, who on their part discreetly avoid all mention of them in conversation.

TOPOGRAPHY.

The old capital, which still bears the name of the State, was called *Villa Bella* in the flourishing days of the mining industry. In 1737 the first settlers had formed an encampment at *Porto Alegre* some distance off, and the river which joins the Guaporé two miles above *Matto Grosso* has preserved this name of Alegre. But the city properly so-called dates only from 1752. At one time it had a

Fig. 112.—MATTO GROSSO AND THE UPPER GUAPORÉ.

Scale 1 : 350,000.



population of 7,000, but it was ruined by the abandonment of the mines, and is now one of the most wretched villages in Brazil; it is also one of the worst situated, and travellers speak of it as a hotbed of fever. Were it not maintained by the Government as a military station, it would soon be forsaken by its few remaining white residents.

S. Luiz de Cáceres, formerly *Villa Maria*, is better situated on the left bank of the Paraguay above the Jauru confluence, at the converging point of several natural routes, and in a splendid grazing district. The neighbourhood contains inexhaustible stores of iron ores, which have not yet been worked. An islet in the Uberaba lagoon is so charged with sulphuret of iron that if a fire is kindled on the ground the heat causes the pyrites to explode, and sets them flying in all directions.

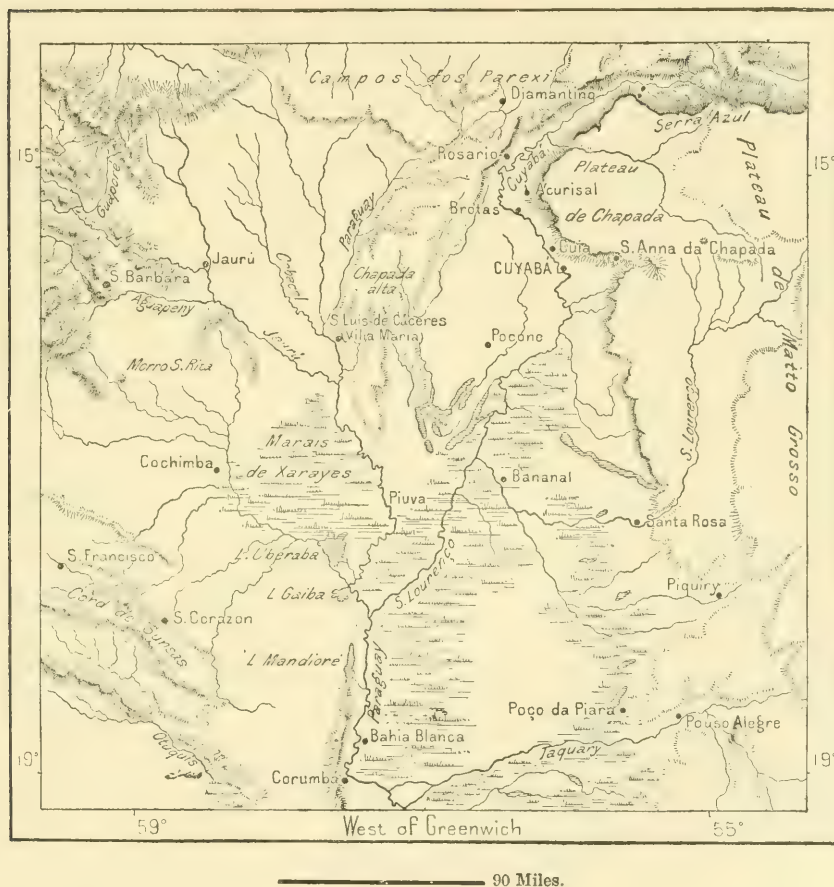
Cuyaba, the present capital, stands on a plain encircled by an amphitheatre of hills, opening in the direction of the west. Its first inhabitants, the Cuyaba Indians, were dispersed by the gold-hunters at the beginning of the eighteenth

century, and in 1820 this mining town supplanted Villa Bella (Matto Grosso) as the administrative centre. It owed this distinction to the salubrity of its climate, thanks to which it continues to increase, although it has scarcely any trade or industry, and has long ceased to work the exhausted gold mines of the district.

In the neighbourhood of Cuyaba a few settlements have sprung up, amongst others *Rosario* in the north, *Sant' Antonio* in the south, *Poconé* on a lateral affluent in the south-west, while the *fazendeiros* (cattle ranches) are defended from the predatory Indians by a military colony on the S. Lourenço in the south-east.

Fig. 113.—CUYABA AND THE PARAGUAY.

Scale 1 : 5,500,000.



Corumbá, founded in 1788, under the name of *Albuquerque*, a name since transferred to a station established lower down below the Rio Miranda confluence, stands on a high limestone cliff, dominating the right bank of the Paraguay at the junction of the Cáceres lagoon. Recognising the importance of its strategical position, the Brazilian government has strongly fortified *Corumbá*, and has established an arsenal at *Ladário*, a little lower down, on such a vast scale, that after twenty-five years it still remains unfinished. *Corumbá* is the chief port of southern *Matto Grosso*, and

is accessible for half the year to large vessels, which do a brisk trade in cattle, salt, and lime. In the district are some extremely rich iron ores stored up for future use.

In 1876, when the Brazilian garrison evacuated the city of Asuncion to fall back on Corumba, the Paraguayan sutlers and menials migrated with the troops, and thus suddenly doubled the population of the town. Since then, many young Paraguayan women have moved in the same direction. They lose no favourable opportunity of removing to Corumba, where the chances of marriage are much greater than in Paraguay itself, the female sex being here greatly in excess of the men. The European immigrants have also begun to find their way to Corumba, to which place the Bolivians of Santa Cruz de la Sierra forward supplies across the wilderness.

The Taquary and the Miranda, which join the Paraguay, the former above, the latter below, the Albuquerque, have some small settlements, destined one day to become flourishing centres of population. *Herculaneo*, capital of the Taquary district, is better known by the name of *Coxim*, from the Rio Coxim. On the Miranda the chief places are *Nioac* or *Levergera* and *Miranda*, the latter dating from the year 1778. Near *Coimbra*, on the right bank of the Paraguay, below the Miranda confluence, visitors are shown a group of vast underground chambers, connected by narrow galleries. Of the *Fort Olimpo* (*Borbon*), still figuring on the maps, nothing remains except a crumbling ruin. All the other military posts in the same unhealthy district have been abandoned since the war with Paraguay.

Such were the stations established on the *Pão de Açucar* and the *Fecho dos Morros*, two little bluffs facing each other east and west on the banks of the river. The plans prepared by the engineers for the fortifications of these places have, for the present, been suspended, but Brazil has not withdrawn her claim from Fecho dos Morros, although, according to the indications of the map, it lies within the Bolivian frontier. The Brazilian diplomatists being reluctant to leave such an important strategical post to the conterminous state, argued that those hills on the left side of the river really belonged to Brazil, because during the periodical inundations the Paraguay overflowing its banks transforms them to an island, and thus transfers them to the opposite side.





CHAPTER XIV.

MATERIAL AND SOCIAL CONDITION OF BRAZIL.



ALTHOUGH no accurate returns have yet been made, approximate calculations show that the population of Brazil continues to increase at a rapid rate, having advanced from about 2,000,000 in 1776 to seven, perhaps even eight, times that number in 1894. Should this rate of increase be maintained, long before the middle of the twentieth century Brazil will comprise as many inhabitants as France.

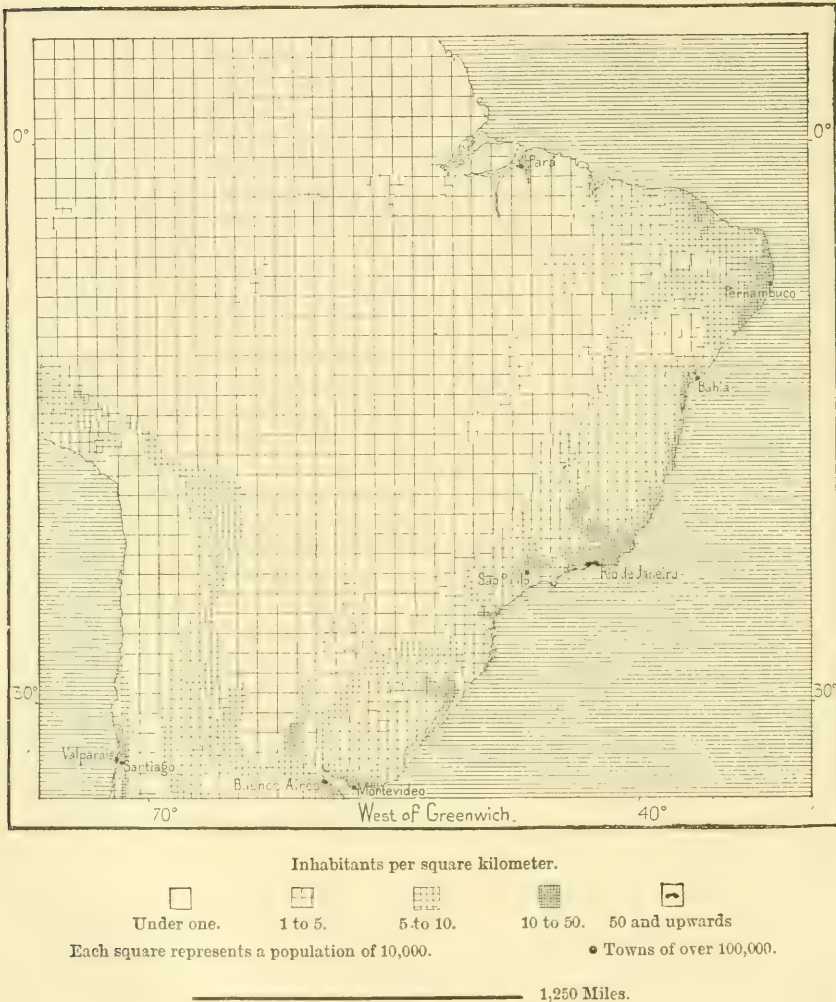
No attempt at an official census can be entirely successful in Brazil, owing to the suspicious dread of all interrogations, and the difficulty of getting the ignorant natives to sign papers. The printed forms for the census of 1890, which has not yet been completed in some States, comprise a long list of inquisitorial questions regarding physical defects, income, and so forth, which even the public functionaries refuse to fill in. Everywhere the returns are known to be below the actual figures; whole parishes have escaped altogether, and even in the State of Rio de Janeiro one-third of the inhabitants appear to have been overlooked. Two fresh attempts were made to remedy the defect, and even then the final result (1,050,000) was believed to be at least 350,000 short of the truth. In many instances statisticians prefer rough estimates to "official" figures, which are known to be grossly inaccurate.

In many cases the population, in which the European and African elements greatly outnumber the aborigines, is very unequally distributed over the country. The immigrants have naturally been mainly concentrated on the seaboard, where the whites have tended to gravitate towards the more temperate southern provinces; while the blacks, introduced originally as slaves, are most numerous in the tropical northern States. In this movement the boundless regions of Amazonia and Matto Grosso have hitherto taken scarcely any share. Hence while some of the more favoured coast districts are relatively thickly peopled, more than half of the whole territory has less than one person to four or five square miles. In general, Brazil is still 36 times less peopled than France, and 109 times less than Belgium.

Various attempts have been made to classify the people by races, or sub-races, or by the element of colour—white, black, yellow, or red. Thus, according to a local census of 1886, of 1,000 inhabitants of S. Paulo (Paulistas), 667 were returned as whites; 135 as *pardos*, “people of colour,” in the North American sense of this expression; 104 as *pretos*, “blacks”; and 84 as *caboclos*, of Indian

Fig. 114.—DENSITY OF THE BRAZILIAN POPULATION.

Scale 1 : 45,000,000.



descent. But such essays can scarcely be accepted as even approximately accurate indications of the extent to which miscegenation has actually taken place. In Matto Grosso and the other inland provinces distinctions are drawn between “whites” and “whites,” some (the Portuguese) being *brancos verdadeiros*, “true whites,” others *brancos da terra*, “native whites.” One fact seems established in favour of this white element, which must go on increasing, thanks to the

steady immigration of Portuguese, Italians, Germans, and other European immigrants. It is noteworthy that many, both of the Portuguese and Italians, marry negroesses.

It was long doubted whether Europeans could become acclimatised in Brazil. But experience has placed the matter beyond doubt, as far as regards the southern provinces from S. Paulo to Rio Grande do Sul, as well as the uplands of Minas Geraes. Even North Europeans thrive better in their new homes than in their native land, as shown by the birth-rate, which exceeds the mortality three, four, five, or even six times.

Immigration to the tropical regions is, on the other hand, attended by great risks. Nevertheless, the numbers of full-blood whites who have perpetuated the race in the Amazonian States, shows that here also they may become acclimatised. Thus the coastlands from Maranhão to Bahia are inhabited by four millions, of whom over one million are whites, showing no trace of mixture. These have come chiefly from the Azores, Galicia, and the banks of the Minho and Douro in Portugal. Some Basques, Spaniards and Provençals have also succeeded in founding families, which have preserved the racial qualities of strength, activity, and refinement.

The healthiest districts appear to be the Bahia and Minas plateaux, the Parana campos, and the elevated plains of Rio Grande do Sul. A specially favoured district is that of Santa Anna de Contendas, on the east side of the Rio S. Francisco, below the Rio das Velhas confluence. Here families have increased a hundred-fold since the end of the eighteenth century, and many patriarchs have seen gathered round their table hundreds of descendants. In some years the mortality has fallen to one-twentieth of the births.

With good reason European immigrants dread the yellow fever, which had ceased to ravage Brazil after the close of the seventeenth, but again made its appearance towards the middle of the nineteenth century. Since then the coast towns, especially Rio and Santos, have suffered terribly from its visitations. But it appears to be confined to the seaboard, and settlers on the plateaux, beyond the Serra do Mar, 2,800 or 3,000 feet above the sea, are completely exempt from its attacks. On the other hand, cholera, fatal especially to the negroes, knows no limitations of altitude or climate. But its visits are rare, and it certainly makes less victims than either phthisis or beriberi. In the interior goitre is prevalent, and on the seaboard elephantiasis and analogous diseases are far from rare.

Speaking generally, and excluding certain notoriously unhealthy cities of the seaboard, the whites, whether native born or immigrants from Europe, are less subject to maladies, and have a longer average life than either the blacks or the Indians. Wounds and amputations of limbs heal far more readily under these climates than in the west of Europe. Compared with those of Paris, the hospitals of Pernambuco, where, however, most of the patients live almost *al fresco*, seem to the doctors places of miraculous recovery.

RECENT IMMIGRATION.

Since the middle of the nineteenth century European immigration has acquired sufficient development to materially affect the general growth of the population. In 1891 the number of arrivals perhaps equalled the natural increase due to the excess of births over the mortality. Before the proclamation of independence, the Portuguese alone had the privilege of settling in that part of the New World which belonged to their Sovereign, and even for them the permission was restricted by all manner of official regulations. Strangers actually domiciled in Brazil depended on chance or on special favour to be allowed to remain in the country. They were mostly shipwrecked sailors or passengers, prisoners, and especially mercenary soldiers, whom it would be difficult to restore to their homes, and who generally received grants of land. Nevertheless, the Government also directly introduced "Islanders," that is to say, natives of the Azores, when Portuguese settlers could not be procured to occupy districts possessing a certain strategic importance.

But systematic colonisation had already begun in 1820, when King João VI. settled some Catholic Swiss peasants in the Nova Friburgo district. Four years later was founded the German colony of S. Leopoldo, which is still the most important centre of foreign colonisation in Brazil. Private enterprise supplemented the movement controlled by the State, and many large landowners, anticipating the abolition of slavery, began to substitute free labour for the blacks employed on their plantations. But too often they merely replaced one kind of servitude for another, and several of these so-called "free" colonies ended in disaster. In general the essays at colonisation may be said to have succeeded in exact proportion to the degree of freedom allowed to the settlers. The colonies flourished when the strangers became freeholders; they soon died out when these remained hired labourers or "tenants at will."

The natives of Portugal, who, till about the year 1870, constituted pretty well two-thirds of all the arrivals, were absolutely free settlers, coming either singly or in family groups. Having no objection to any kind of work, they sought employment wherever they could get it without applying to the Government, to the great financial companies, or to any of the syndicates working the plantations. Proportionately to their numbers they took a far more active part than any of the other colonists in the commercial and industrial life of Brazil, as artisans, porters, overseers of slaves, hucksters, wholesale dealers, and in many other capacities. After a few years in the country, many amassed sufficient wealth to return to the *Terrinha*, "Little Land," of their birth, where they built themselves stately mansions, often on the very site of the ancestral cabin.

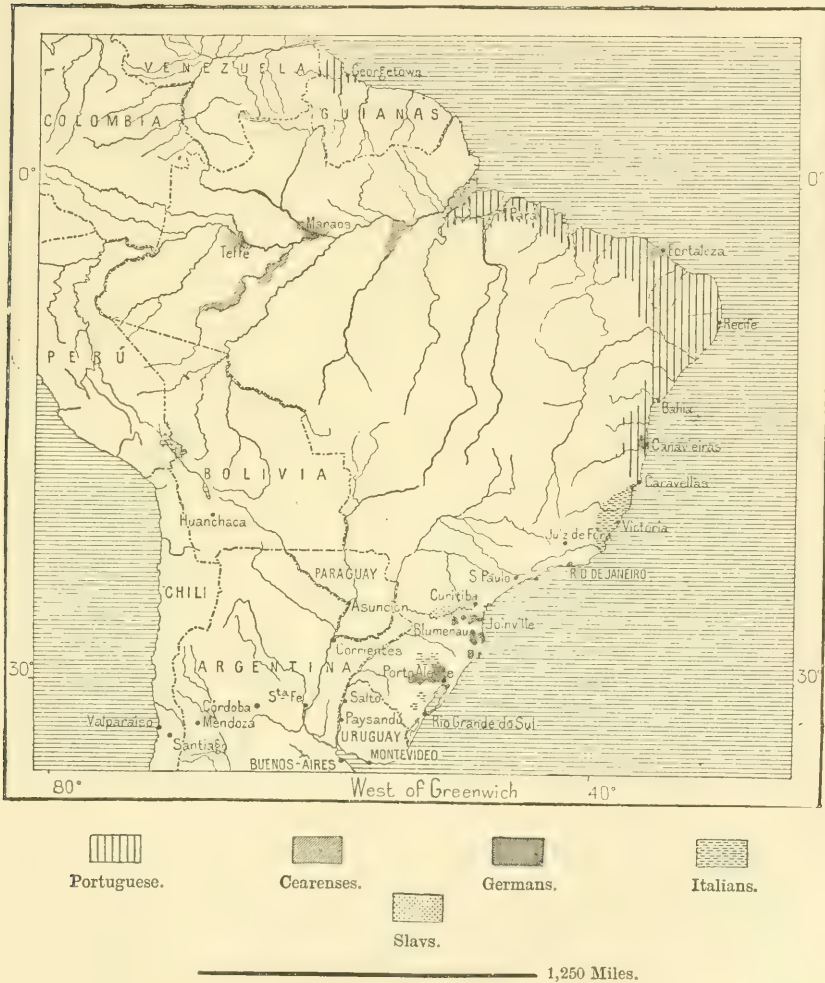
Notwithstanding their defective character, the official returns suffice to show an extremely rapid increase of immigration, especially since the middle of the nineteenth century. During the twenty years from 1850 to 1870 the annual average ranged from 7,000 to 10,000. These figures were doubled in the next decade, then quintupled, and increased tenfold during the last decade. In 1891

nearly 219,000 European colonists were landed at the three ports of Rio, Santos, and Desterro, while others arrived at Victoria, Bahia, Pernambuco, and Para.

In this movement the Italians far outnumber all other nationalities. Over 100,000 immigrated in 1892, and at present they number at least 600,000 in all Brazil, without including their descendants. They are twice, perhaps three times, more numerous than all the Germanic race, who are chiefly concentrated in the

Fig. 115.—CHIEF COLONIES OF IMMIGRANTS IN BRAZIL.

Scale 1 : 45,000,000.



States of Santa Catharina and Rio Grande do Sul. At present (1894) as many as ten Italians are landed for every single German.

The Spaniards, who till recently scarcely emigrated at all, now arrive in large numbers. The Poles also, often called "Germans," because most of them are natives of the Prussian province of Posen, supply a fresh element, with which are associated Lithuanians and Russians. Lastly some Orientals, collectively called

"Turks," but in reality Christian Maronites of Mount Lebanon and Syria, have begun to find their way to Rio de Janeiro.

AGRICULTURE.

Despite the recent increase of agricultural settlements, the extent of land under cultivation is insignificant compared with the superficial area of the country. In many regions the least clearing attracts attention, so accustomed is the eye to wander over interminable forests and savannas on both sides of the track. It would be difficult to obtain accurate statistics on the subject, because the Brazilian peasant is still half a nomad. There being no lack of land, whenever the ground seems exhausted he abandons his holding, and makes a fresh clearance in the woods. The impoverishment of the soil is revealed by the encroachment of certain plants, such as the *samambaia* (*polypodium incanum*) in S. Paulo, and in South Minas and elsewhere the *tristegis glutinosa* or *panicum melinis*, which follows the cultivator in all his wanderings.

Except on the large plantations the method of tillage is of an extremely primitive character, based on the process followed by the Tupi aborigines. It must be described rather as a reckless plundering of the soil than an orderly system of husbandry. Nevertheless, each peasant obtains in abundance all that he requires for his own consumption—manioc, black beans, rice, maize, bananas, yams, and sweet potatoes. The standing dish of all Brazilian tables, the *feijoada*, as it is called, comprises the first three ingredients, to which is usually added the *carne secca* (jerked beef), imported from Rio Grande do Sul and the Argentine regions.

Next to provisions the most important product of the soil is coffee, introduced from Cayenne in 1727. But this plant, first grown at Para, possessed no economic importance till the declaration of independence. Since then its cultivation has spread so rapidly that, despite epidemics, financial crises, revolutions, Brazil has outstripped Java, and all other coffee-growing lands, and at present supplies more than half of the world's consumption. It thrives almost everywhere, although the great plantations are limited to the regions stretching from Espirito Santo to the Rio Parana, with Rio de Janeiro as their centre. About half the exported article is still forwarded through the port of Rio; but the largest and most productive plantations are now found in the State of S. Paulo, where the best quality is also grown.

Many of the planters, especially in the States of Rio de Janeiro and Minas Geraes, mostly absentees wedded to the old ways, were ruined by the emancipation. But those of S. Paulo had prepared for the crisis by introducing free hands, and thus weathered the storm successfully. Instead of being impoverished they became more prosperous than ever. When the slave system was condemned, but before its abolition, one of the great planters, the Viscount of Nova Friburgo, exclaimed lugubriously, addressing his words to Java and the other foreign coffee-growing lands: "For you the future! all hope of preserving our plantations ends with to-day."

The Brazilian plant, which is said to be the richest in Caffeine, scarcely begins to yield before the fourth year, but gives abundant returns from the sixth to the sixteenth or twentieth, after which there is a gradual falling off to the thirty-fifth or fortieth year, when the plantation must be renewed. Usually it needs no manure beyond its own foliage, and the weeds raked in between the rows. The intervening ridges may even be planted with maize, sweet potatoes and beans. But frosts are much dreaded, especially on the low-lying ground, for once nipped the shrub takes two or three years to recover. It has also its parasitic diseases, which, however, have hitherto been less destructive than in Java. On all the large plantations the berry is cleansed, dried, sorted, and sacked for the market in vast establishments, employing hundreds of families, which usually live in wretched villages, recalling the worst days of the *ancien régime*.

Since the abolition of slavery the total yield has greatly increased, but this increase has been almost exclusively confined to the large estates. In the "red lands" of S. Paulo some of these estates comprise over 25,000 and even 50,000 acres, and certain great railway stations owe their existence entirely to the requirements of a single plantation. One of the domains belonging to a financial company with a capital (1893) of £400,000, employs 4,200 hands, nearly all Italians, grouped in 26 villages and hamlets; in favourable years this fazenda may yield as much as 6,000 tons of coffee. The astounding development of this industry, especially in the State of S. Paulo, where a billion plants are reckoned, certainly presents a marvellous picture of agricultural progress.

In Brazil, under the almost temperate climate of Rio de Janeiro and of S. Paulo, the coffee shrub needs no protection from the burning rays of the sun, as in Venezuela and other tropical lands, where the young plant is sheltered by the overhanging branches of the cacao, erythrina, and other "foster mothers," as they are called. Even the wild plant flourishes better beneath the shade of tall forest trees than in the clearings in Kaffaland and other hot countries, where it is indigenous.

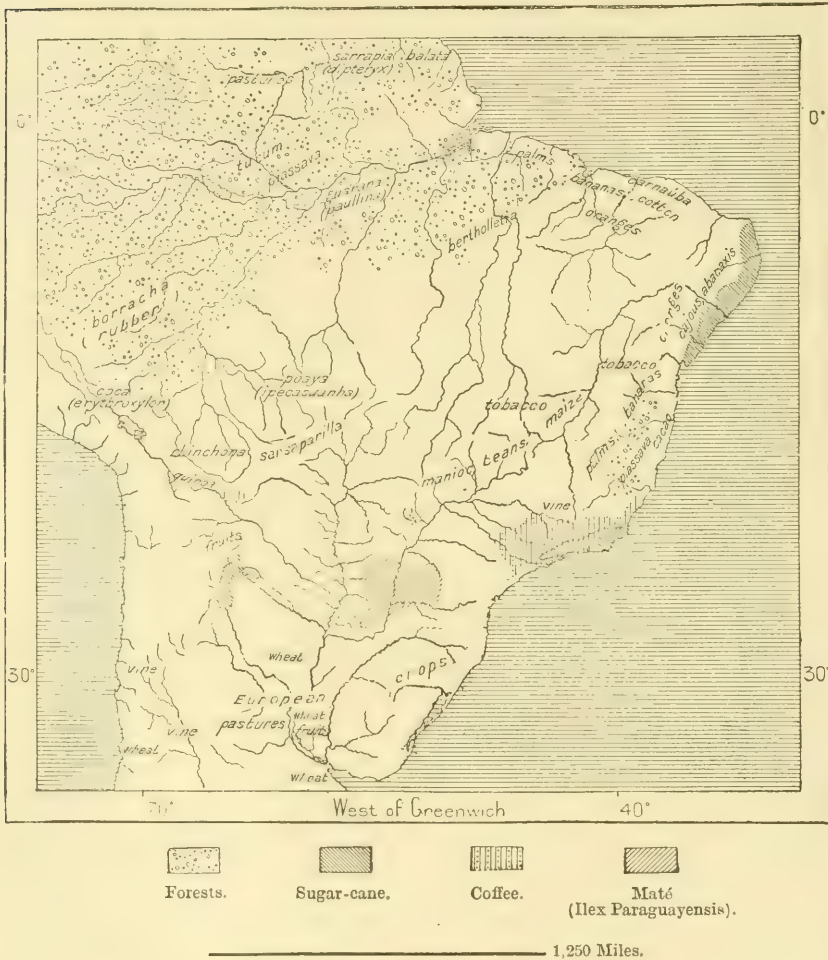
There was a time when Brazil also took the lead in the production of sugar. But it has long been outstripped in this respect by the West Indies, and the district of S. Vicente, where the cane was introduced from Madeira in the first half of the sixteenth century, now produces next to nothing. At present the industry is represented chiefly in Pernambuco, Bahia, and neighbouring provinces. Much of the yield is used in the preparation of cachaça, a brandy which is found in every Brazilian house, but which is not much appreciated by strangers.

Cotton is grown chiefly in Ceares and the other northern States. After the impulse given to it during the war of Secession, the industry languished, but has since shown symptoms of revival under the almost prohibitory tariff imposed on foreign cotton goods. The tobacco especially of Bahia and Goyaz is highly esteemed. Over five-sixths of the leaf is exported chiefly to Germany and France, whence it returns in the form of cigars and cigarettes. The total annual yield may be estimated at from 40,000 to 50,000 tons, valued at from £1,000,000 to £1,200,000.

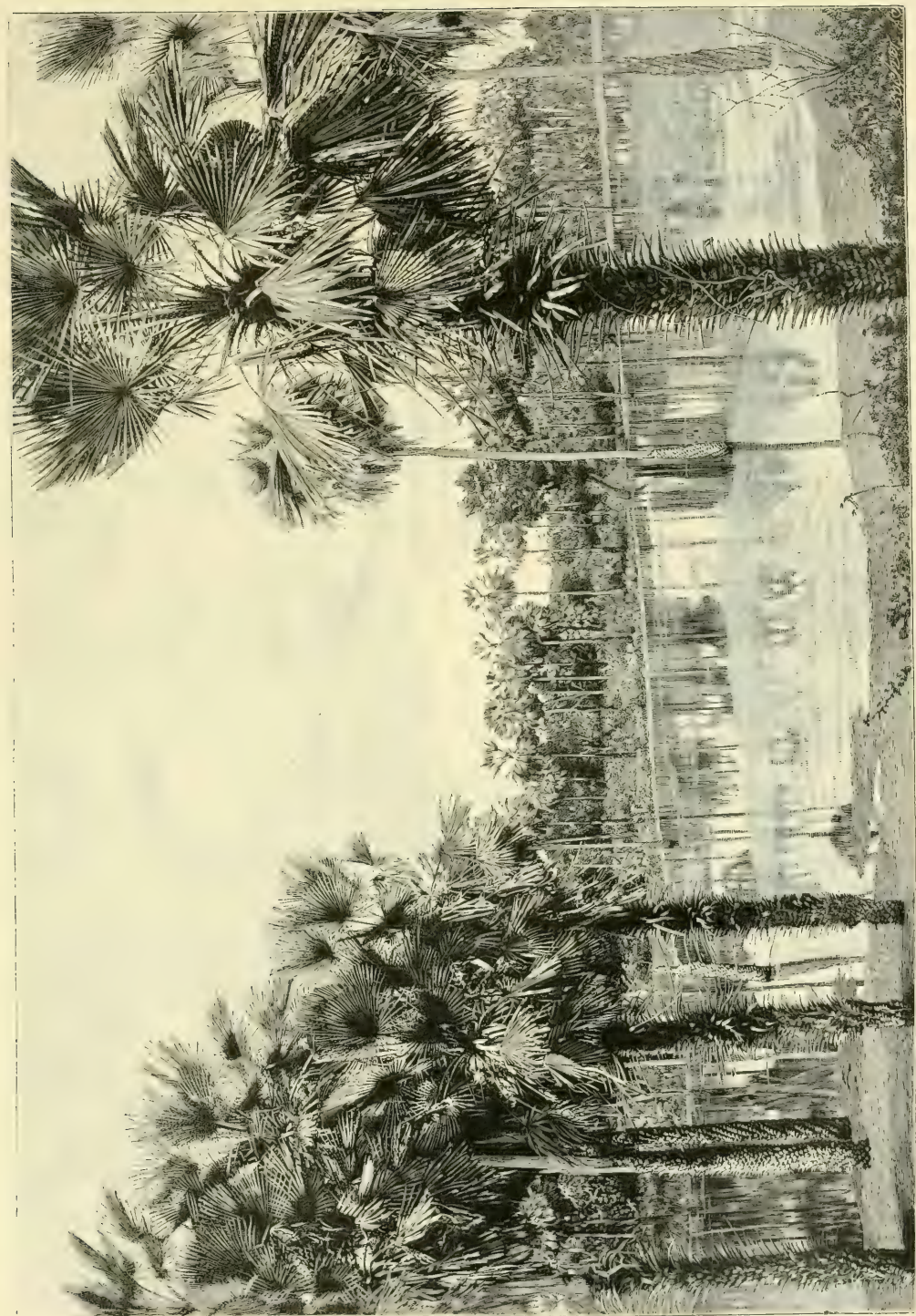
Cacao thrives in Amazonia, and especially in the Canavieiras district in the State of Bahia, which yields about 6,000 tons, or the tenth part of the world's annual production. Although tea succeeds well on the S. Paulo and Minas Geraes plateaux, this shrub is scarcely seen except in gardens, being driven from the market by the competition of China and India. The so-called "Brazilian tea" is the Yerba maté grown in the province of Parana, and exported chiefly

Fig. 116.—CHIEF FOREST AND AGRICULTURAL PRODUCTS OF BRAZIL.

Scale 1 : 45,000,000.



to Belgium to the extent of about 14,000 tons a year, valued at £320,000. The orange, of which there are numerous varieties, some of prime quality, grows spontaneously, needing no pruning or grafting. The fruit is largely exported to La Plata, and also used in Santa Catharina for the manufacture of orange wine. Great hopes are entertained of the vine, especially in Minas Geraes, where the American stock succeeds admirably. Some growers have already obtained highly esteemed wines, which they compare to the tokay, champagnes and clarets of Europe.



CARNAUBA PALMS.

Other European plants have little economic value, except in Rio Grande do Sul. But even here wheat has been attacked by mildew, and is being gradually abandoned in favour of stock-breeding. Rice, which might be largely grown on the marshy lowlands, and which is a staple article of diet throughout Brazil, is almost entirely imported from Burma. The ant, which till recently made all cultivation impossible in some districts, and which was popularly called "king of Brazil," is no longer dreaded by the farmer. Certain *formicides* ("ant-killers"), introduced into the nests, destroy their inhabitants, and the smoke from the explosions may often be seen issuing from every fissure in the ground. To get rid of rats many gardeners keep a tame *giboia*, a small boa 10 or 12 feet long, which sleeps through the day and hunts at night.

In a region of boundless woodlands, such as Brazil, forest produce must always hold an economic position of primary importance. The city of Para holds a monopoly of the export trade in rubber, here called *borracha*, and in the *bertholletia*, or "Brazil nut," forwarded chiefly to England and Russia. Amazonia also exports the guarana bean, and large quantities of medicinal plants, while Ceara and the neighbouring coastlands, as far as Sergipe, supply the wax of the carnauba palm. This palm yields, besides wax, a wine, a gum resembling sago, a sap which answers as a substitute for cork, an edible fruit, and a fibre from which textile fabrics are woven. The wax, which covers the leaves in the form of a glutinous powder, and which is extracted by heat, is used in Europe for various purposes, such as the preparation of tapirs and varnish, and also for colouring paper. England imports the fibre of the piassava palm (*atalea funifera*) for making brushes and brooms. All the seaboard States abound in excellent timber, cabinet and dye woods. To one of these plants, the *echinata caesalpinia*, Brazil owes its name. Another, the Jacaranda, has such an exquisite grain that it has been named the *palo santo*, "holy wood," whence is derived the French word, *palissandre*, and the English *palisander*, a somewhat obsolete name for rose-wood.

STOCK-BREEDING—LAND TENURE.

In horse and cattle breeding Brazil is outstripped by Argentina, although possessing on the central plateaux and southern campos a nearly equal extent of pastures. The industry, however, flourishes in Rio Grande do Sul, which supplies Rio and other northern cities with a hardy breed of small mules, noted for great staying power and endurance. Goyaz, Matto Grosso, and Minas also send to the coastlands their *boiadas*, or droves of oxen, which reach their destination by short stages, browsing by the way on both sides of the track.

In the central regions these animals spring from two very distinct stocks, which may be recognised especially by the length of the horns, which in the Minas Geraes cattle may attain as much as six or seven feet from tip to tip. The Jersey cow, the Indian zebu, and other stock, are now contributing to the improvement of the native breeds. In Minas Geraes dairy-farming has acquired a great development, and Minas cheese is now found on every table.

Monarchical traditions have been perpetuated so far as regards the division of the soil. The great captainries and crown fiefs are still retained under other names, and the nation possesses very few small freeholds, while vast spaces are owned by a small number of great lords, to whom the very limits of their domains are unknown. Some of these domains, even in the more thickly peopled districts, are measured by the square league, and the owners, unable to find the hands needed to work such immense territorial estates, still complain of the scarcity of labour.

Possibly the land would be better tilled were these fertile tracts distributed amongst numerous small freeholders, instead of being held by a few great landlords. After the abolition of slavery, when the planters saw nearly all the blacks abandoning the workshops and farmsteads, they brought against them the charge of laziness. But these slaves of yesterday, tired of working for one taskmaster, had merely withdrawn to the forest clearings, where they have settled with their families and a few domestic animals, and where they cultivate their little banana, bean, or manioc fields, without neglecting the flower garden. Nevertheless, a number of the old slaves have since returned to the plantations to work as free hands on the spot where they were born.

Whatever be said to the contrary, it is these very blacks, descendants of the old slaves, that supply the greatest part of the labour in these agricultural districts, to which Italian, German, and other peasants have not yet penetrated. The whites that have no share in the ownership of the soil, the "poor whites" as they would be called in some of the Southern States, the "petits blancs" of Louisiana and the Antilles, preferred to live as *agregados*, that is, as parasites on the seignorial domain; some proprietors had hundreds of this class hanging about their fazendas. Occasionally they might render some little service to their host; if they owned a few head of cattle, these were allowed to roam about with their master's herds, and they freely helped themselves from the well-stocked granaries whenever they fell short of the necessary supplies. The easy and kindly habits of the population harmonised very well with this state of things, all the more so that the *agregados*, by making the lord of the manor godfather to their children, thus became his co-sponsors, a tie considered as almost sacred.

But the relations between the large proprietors and the lackland classes have been greatly modified by the political and social changes that have taken place in recent times. Most of the *agregados* can now be got rid of by getting them situations in the thousand bureaucratic offices of the State, the parish, or the municipality. Nevertheless, the land problem remains practically untouched for all the inhabitants of the rural districts, whether blacks, *agregados*, or foreign settlers. Thanks to their frugal habits, the Africans have been able to rest satisfied with their little patches of land obtained here and there on the borders of the great domains, or in tracts belonging to the State. But the foreign peasantry are more exacting, and only a small part of their demands has been met by the lots assigned to them, either on the national lands or in the distribution of the large private estates.

Even the system of *parceria*, leaseholds or joint tenure, is looked on askance by the new generation of settlers from the Old World, who had crossed the Atlantic in the hope of becoming independent freeholders. This is the great question for the immediate future of Brazil. The cultivators claim the land; they even seize it in certain districts, and cultivate it for their own benefit, while the title-holders seek to dispossess them. Desirous of continuing under other forms the old system of bondage, they have induced the legislature to vote the introduction of coolies on the plantations, under the usual conditions of contract labour. But the "Celestials" are still slow to arrive; nor has the Pekin Government shown itself ready to meet the views of the Brazilian planters. The few Asiatics hitherto introduced will not suffice to avert the coming storm, and the struggle between the great landowners and the lackland classes must grow to a head.

MINING INDUSTRY.

Although agriculture now takes the first place in economic importance, in the last century mining operations supplied by far the largest share of the foreign exports. Compared with Mexico and Peru, lands of silver, Brazil was essentially the land of gold. In the very first century of the occupation goldfields had been discovered, especially at Taubate, between Rio and S. Paulo, and the Paulistas, in their onward movement to the north and west, soon came upon *rios de Ouro*, "gold rivers," in almost every part of the vast region comprised between the Andes and the Bahia coastlands. Most of these deposits are now abandoned, the mines owned by Portuguese adventurers in Peru being naturally the first to be closed, owing to the penal measures taken by the Spanish viceroys, jointly with the inquisition, against these intruders, charged with preparing the conquest of the land. Many of the Portuguese pioneers are said to have avoided the dreaded tribunal of the inquisition by flight, after first throwing their treasures into the lakes and rivers, and then blocking the galleries leading to the underground works. Even the Goyaz mines, which, in the eighteenth century, yielded larger quantities of the precious metal, are no longer worked, except by a few searchers, by primitive processes.

Gold also occurs in Parana, Rio Grande do Sul, Santa Catharina, Maranhão and Piahy, but is nowhere systematically mined. At present nearly all the metal exported from Brazil comes from Minas Geraes, the mining State in a pre-eminent sense. Towards the end of the seventeenth century a beginning was made with the washing of the sands and gravels (*cascalhos*) detached from the auriferous reefs, and almost everywhere covered with a ferruginous conglomerate (*canga*). In 1698 the Ouro Preto mountains were attacked, and now the natives were compelled to work under the lash. Nearly the whole of the ground was turned over for a distance of 280 miles, and a breadth of 140 miles on both sides of the main range, and in the valleys draining to the Rio das Velhas. From the route between Ouro Preto and Sabara is seen an open cutting carried to a

depth of over 130 feet for several miles across the hills. Above the mining village of Passagem, near Ouro Preto, the hill has been carved into all manner of fantastic shapes as if thrown up by some volcanic eruption.

During their days of prosperity the potentates of Minas Geraes displayed the vulgar splendour which has at all times distinguished upstarts suddenly enriched. They built themselves palaces, where sumptuous banquets were daily spread before friends and all comers, and when the captain-general honoured their table, he was usually served with a dish of *cangita*, in which the grains of maize were replaced by nuggets. At the processions of the Blessed Sacrament from church to church the horses were shod in gold, and in the courts pleaders sup-

Fig. 117.—GOLDFIELDS OF CENTRAL BRAZIL.

Scale 1 : 1,200,000.



ported their clients' cause by presenting the judges with bananas stuffed with gold.

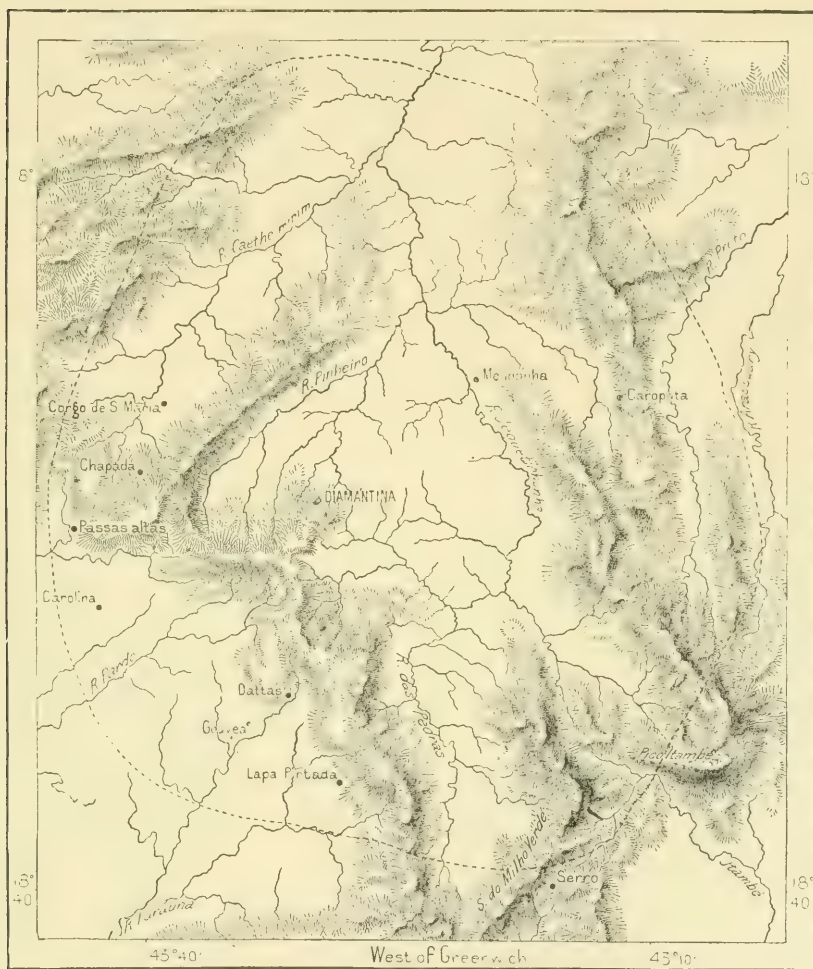
According to Gorceix, Minas Geraes alone yielded between 1700 and 1888 nearly 1,450,000 pounds weight of gold, worth about £74,000,000, and the total product of the whole of Brazil appears to have fallen little short of £120,000,000. At present the output is estimated at from £160,000 to £320,000 a year. Most of the mining companies are English, and their operations are limited to the region of Minas Geraes, north of the Queluz knot, between Ouro Preto and Sabara. They no longer work the alluvial deposits of rivers, but attack the auriferous reefs themselves, following up the lodes for great distances, and to depths of hundreds of yards. The ores are conveyed by railways, or shot down

inclined planes to the crushing machines, where the triturated masses may be washed and levigated by the running waters of rivers and canals. Although the works have been gradually retrenched by the diminished output, and by the increasing price of labour, the foreign capital invested in this industry still yields fair returns.

The diamond industry, at one time the most important in the world, has been

Fig. 118.—LIMIT OF THE MINING INTERDICT ABOUT DIAMANTINA IN THE EIGHTEENTH CENTURY.

Scale 1 : 800,000.



Limit of the old Mining Interdict.

18 Miles.

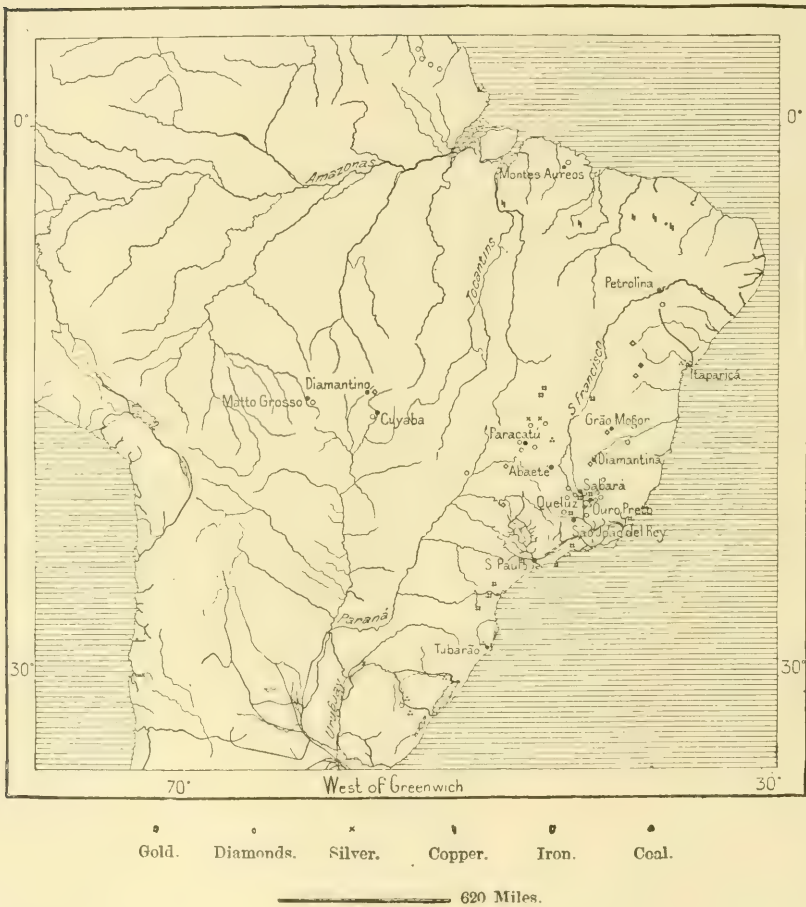
suddenly ruined by the discovery of the South African diamantiferous fields. In 1733 the Portuguese Government first became aware of the existence of diamonds in Minas Geraes, and true to the traditional policy of regarding Brazil as its *vacca de leite*, "milch-cow," it at once proclaimed itself sole proprietor of all the diamond fields. Then a space 42 leagues in circumference was enclosed

round Diamantina, indicating the limits of the interdicted territory. Within these limits nobody could dig the foundations of a house except in the presence of an inspector and three other officials.

The diamond streams were reserved for certain privileged persons liable to a poll-tax on the number of hands employed. Later the deposits were leased to farmers-general, and at last the King of Portugal had all the mines worked on his own account. At present the industry has been declared free. The term

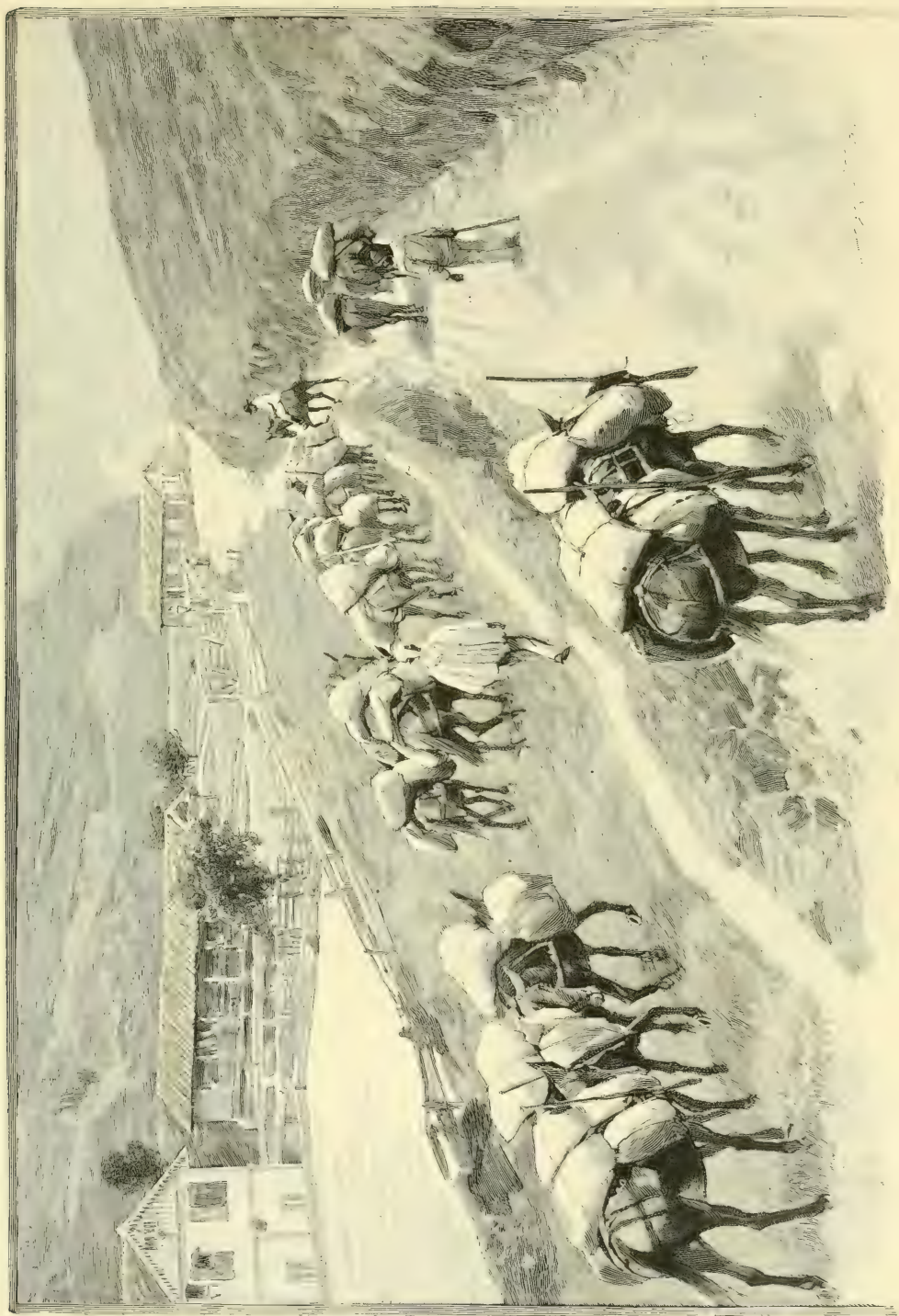
Fig. 119.—CHIEF MINES OF BRAZIL.

Scale 1 : 45,000,000.



catas, figuring on the maps in several parts of Brazil, means "excavations," and has reference to the old gold or diamond diggings.

These gems have also been found in Matto Grosso, and (1845) in the Chapada Diamantina of western Bahia. But operations are, for the most part, carried on without method, and by primitive processes. The stones occur in association with other gravels, both in the conglomerates of paleozoic origin, and in more recent rocks derived from the triturated fragments of primitive strata. But they



MULES TRANSPORTING MINERALS.

have nowhere been met in igneous formations. The output from the whole of Brazil down to the present time is estimated at 12,000,000 carats, or nearly $2\frac{1}{2}$ tons, valued at £20,000,000. Since the opening of the South African mines the yield has rapidly fallen off, from 90 pounds in 1867 to 40 in 1880, and at present (1894) to about 20, valued at £40,000. Although the African diamonds are less beautiful, their total sale already greatly exceeds that of the Brazilian stones for the whole period of over 150 years since the commencement of mining operations in Minas Geraes. Amongst the more famous stones found in Brazil are the *Abaeté* brilliant, of 144 carats, and the “Star of the South,” which was picked up by a negress in 1853, and which before cutting weighed over 254 carats.

Besides diamonds, numerous other gems occur in Brazil, such as garnets, topazes, corundum, beryls, and amethysts. But no true emeralds are found, and the “green stones” taken for such were probably tourmalines.

Despite their abundance, few of the other metalliferous beds are utilised. The copper mines of Rio Grande do Sul are alone worked, and a little iron ore is supplied to the foundries from the inexhaustible deposits of Ipanema in S. Paulo, and of the two iron mountains of Itabira do Campo and Itabira do Matto Dentro in Minas Geraes. This State also contains lead, and the coalfields of Santa Catharina and Rio Grande do Sul support some small local factories.

At S. Caetano, near Marianna, in Minas Geraes, occur some beds of excellent kaolin; the lignite of S. Paulo employs a few hands; and here and there turf is extracted from the peat-beds occupying the old lacustrine depressions. Salt, vast quantities of which might be obtained from the mines and saline streams and marshes, is still imported from Europe, chiefly as ballast in English vessels.

MANUFACTURES—TRADE.

Nearly all the manufacturing industries are represented in Brazil, which abounds in the raw materials, such as metals, timber, gums, dyewoods, fibres, hides. These materials are now worked by experts, engineers, distillers, skilled labourers, who are annually arriving in increasing numbers. These industries are encouraged by the heavy duties imposed on foreign goods, but the result is that the cost of production is much higher than in the European industrial centres, and this implies a corresponding loss to the local consumers. Spinning and weaving are the chief manufactures fostered by the high protective tariffs, the abolition or even reduction of which would involve half the native factories in ruin.

Other industries are chiefly those needed to supply the towns and settlements with primary necessities, such as bricks, lime, cement, furniture, carts, waggons, besides distilled and fermented drinks. Many demands are created by the rapid development of the railways and other means of communication. The state of the highways in former times may be judged from the fact that the convoys of minerals and other merchandise, usually in groups of seven men and seven pack-

mules, took on an average one month on the road from Ouro Preto to Rio de Janeiro. An English company having proposed to construct a proper road along this route, it was objected that good highways would throw open the country to foreign conquest.

Since the close of the colonial rule trade has certainly increased tenfold. Foreign goods are no doubt heavily taxed, but at least they are not interdicted as they were previous to the year 1808. A Portuguese financial association long enjoyed the monopoly of the trade with Brazil, to protect which it had to equip a fleet of war-ships. At the beginning of the nineteenth century this monopoly was said to represent about £6,000,000 a year. But towards 1850 the exchanges rose to £20,000,000, and in 1880 they had exceeded £40,000,000. Since then they have continued to increase despite revolutions, civil wars, heavy tariffs, reckless speculation, gambling, and fraudulent transactions of all kinds. Companies have been floated with nominal capitals, which within a fortnight have called up shares to the value of £40,000,000, or even £80,000,000. In 1891 the various schemes in operation represented eleven times the whole income of Brazil.

Besides manufactured goods the imports include many articles which might well be produced on the spot. Such are bread-stuffs, rice, charqui (jerked beef), from Uruguay and Argentina, bricks, tiles, flags and the like. English biscuits and pale ale, and sardines from Nantes may be procured in the humblest village of the interior. The exports, which on an average exceed the imports, comprise coffee, representing four-fifths or even more of the total value, rubber, sugar, cotton, tobacco, cacao, Brazil nuts, maté, gold and diamonds.

Thanks to special tariffs the United States takes the first place in the foreign trade of Brazil. In 1892 it imported over 2,400,000 bags of coffee from Rio, while the rest of the world received less than 1,000,000 bags from the same port. On the other hand Santos sends its coffees chiefly to Europe (Bremen, Hâvre, Antwerp, Trieste). Great Britain ranks next to the United States in the movement of exchanges, and takes by far the first place in the carrying trade. France, Germany and Italy follow in the order named, while the mother country takes only the fifth place, although the majority of the merchants are Portuguese. Even in Rio the industrial and trading classes comprise four times more natives of Portugal than Brazilians. The old colony, however, still continues to be the best customer of the Lusitanian wine-growers. It is noteworthy that the rapid development of foreign relations has had the effect of diminishing the local coasting trade between the Brazilian seaports. This result is due to the ocean steam navigation, which, by regularly calling at every important harbour along the seaboard, has rendered useless the large dépôts of goods formerly concentrated in Rio Janeiro and distributed from that point to all the coast towns.

COMMUNICATIONS—RAILWAYS.

In Brazil, as in the United States, the necessities of trade have caused the construction of railways to precede that of carriage-roads almost everywhere. When

railway enterprise began the only highways opened to wheeled traffic were, in fact, the fine road from Rio to Petropolis, continued through the Parahyba valley to Juiz de Fora, and a few others in the neighbourhood of the towns. The so-called "main highways," connecting Rio with Minas Geraes, Goyaz, and Matto Grosso, are nothing more than broad tracks, winding up and down hill, scored with deep ruts in the marshy district, and branching into lateral by-ways at the steep inclines. Along these dusty, muddy or rocky tracks teams of six, eight, or ten pairs of oxen slowly drag their lumbering and creaking waggons, while convoys several hundred yards long are organised for the transport of large quantities of minerals and general merchandise. Large convoys of pack-animals, chiefly mules, are also employed for the transport of merchandise along the wretched tracks across the swampy and mountainous districts, which are inaccessible to wheeled traffic. These convoys are usually headed by the so-called *madrinha*, an old horse who carries no load, but wears an arrangement of tinkling bells, and is also often gaily decked with feathers and strips of coloured cloth.

In 1856 the first railway was opened from Rio to the foot of the coast range in the direction of Petropolis. Two years later followed the line also from Rio across the marshy and wooded plains towards the upper Parahyba valley, but stopping short at Belem at the foot of the Serra do Mar. Eventually the mountain barrier was overcome by steep gradients and sixteen tunnels, and from this trunk line between Rio and the Parahyba basin other branches ramified in various directions.

The Serra do Mar has been surmounted altogether at five different points, of which three are in the vicinity of the capital. The Serra de Mantiqueira and the Serra do Espinhaço have also been crossed, and nothing now remains except to extend the system over the gently-inclined slopes of the inland plateaux. The highest point reached by the engineers is at a cutting 4,475 feet above sea-level on the Ouro Preto branch. Although the locomotive has scarcely yet reached the region of the great rivers, some imposing viaducts have already been constructed, notably the bridge spanning the Paraguassu between Cachoeira and S. Felix, that of the Rio Grande on the Uberaba line, and the viaduct over half a mile long in the Tubarão coal-mining district.

Meanwhile only two systems properly so-called have yet been developed, one with its seaward terminus at the capital, the other radiating from Santos. These are, however, themselves connected by a line 370 miles long ascending the Parahyba valley and descending to S. Paulo. The Rio network penetrates far into Minas Geraes, and yearly advances one or two stages into the Rio das Velhas valley at the head of the navigation in the S. Francisco basin.

Still more rapid progress has been made in the State of S. Paulo, where the lines ramifying through the coffee region have already reached the navigable Rios Grande, Pardo, Mogy Guassu, Tieté, and Piracicaba. Elsewhere there are only a few isolated lines, or local systems, such as those of Recife and Bahia Bay.

A great trunk line, such as might give unity to all these isolated sections, is an undertaking still beyond the resources of Brazilian finance. The lines most

urgently needed, at least for strategical purposes, and for cementing the vast outlying provinces in a single political system with those of the seaboard, are the routes projected to run from Rio de Janeiro and Minas Geraes to the Matto Grosso regions, and from the State of S. Paulo to the southern extremity of the Republic. Owing to the lack of such connections, Rio Grande do Sul is at present in economic dependence on the States of the Plate River so far as regards its means of communication, while most of the Far West remains

Fig. 120—RAILWAYS OF BRAZIL.

Scale 1 : 45,000,000.



practically cut off from the rest of the commonwealth. In respect of its relations with Europe, Brazil also greatly needs a continuous coast line to run from Campos to Pernambuco, the first port on the seaboard touched by the transatlantic liners.

No uniform plan has been followed in the development of the Brazilian railways, and in some districts, notably on the Minas Geraes trunk line, a broad is continued by a narrow gauge. On most of the new lines also the normal gauge scarcely exceeds 40 inches. A few of the railways are State property, but the

majority belong to Brazilian or foreign companies, some of which have obtained grants of land along the lines, besides guaranteed interest on the outlay and other subsidies securing them from any pecuniary loss.

They have moreover stipulated that no rival companies shall be allowed to construct any parallel or converging lines within a determined zone. Thus are gradually being created exclusive monopolies, such as that of the railway between Santos and Jundiahy, which, although itself inadequate to meet the growing commercial requirements of this region, claims the preposterous right of preventing the producers from forwarding their merchandise by any other routes. The case is somewhat analogous to that of certain English railway companies, which, to secure the traffic, forward foreign imported goods at lower rates than British produce. In the more remote districts, some of the Brazilian lines, being masters

Fig. 121.—RIO, MINAS AND S. PAULO RAILWAY SYSTEMS.

Scale 1 : 10,000,000.



of the situation, are pursuing a suicidal policy, as so often results from the enjoyment of undue privilege. The traffic is often cut down to a single train once a week between two derelict stations, that being sufficient according to the stipulated conditions of the concession, to entitle the proprietors at the end of the year to draw their dividends, duly discharged by the State treasury. They thus not only stand in their own light, but they block the way to the proper development of the resources of the land.

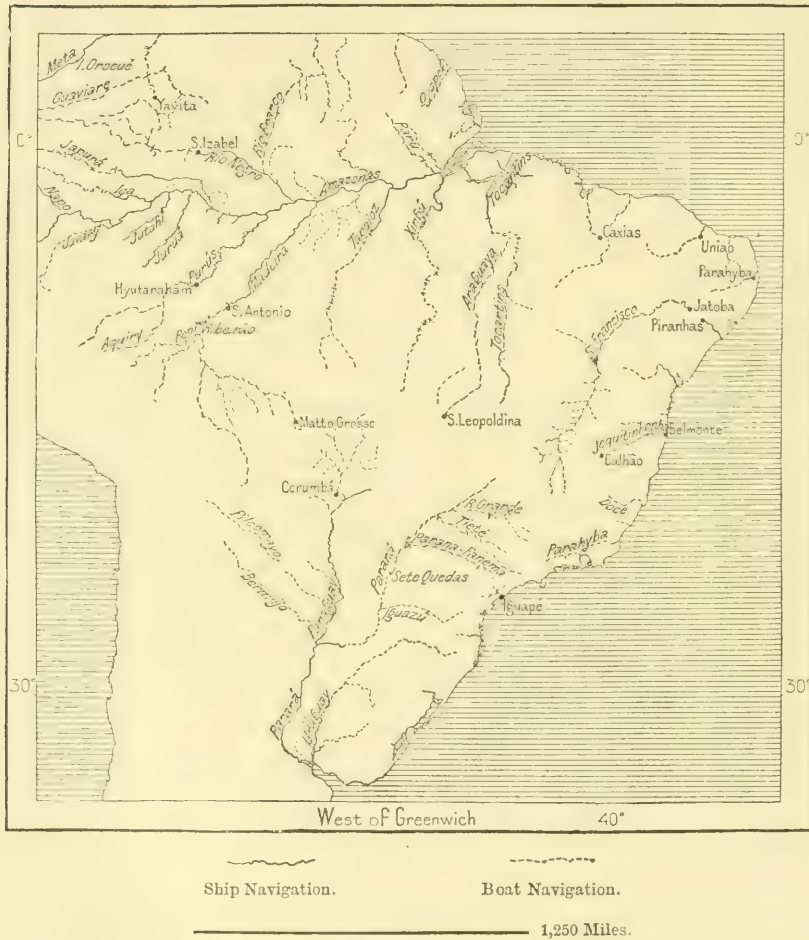
Collectively the Brazilian railways completed in 1893 had a total length of about 6,800 miles. When they have acquired their full development they will afford the most direct route to Europe, not only for the inland regions of the Republic itself, but also for Paraguay, the northern provinces of Argentina, and even a part of Chili itself.

NAVIGABLE WATERWAYS.

Meanwhile, in the absence of railways, except in the vicinity of Para, the Amazonian region depends entirely on its steamers to keep up its relations with the rest of the world. An English company, subsidised by the Brazilian Government, maintains a flotilla which plies on the Amazons between Para and Iquitos in Peru; boats in connection with the main line also ascend the Jutahy, the Jurua, the Purus, and its Aquiri affluent in the heart of the rubber region. They also

Fig. 122.—NAVIGABLE WATERWAYS OF BRAZIL.

Scale 1 : 45,000,000.



visit the riverside ports of the Rio Negro, Madeira, Tapajoz, and Xingu, and ascend the Tocantins as far as the cataracts.

In the rest of Brazil fluvial navigation is of secondary importance. Even that of the S. Francisco is interrupted by the great falls, which have not yet been turned by a canal to connect the lower and upper navigable reaches. But on the seaboard, lines of ocean steamers, rapidly replacing sailing vessels, keep open the

communications with all the large seaports, such as Para, S. Luiz de Maranhão, and Fortaleza, Recife (Pernambuco), Maceio, Bahia, Victoria, Rio, Santos, Paranagua, Desterro, and Rio Grande do Sul. As many as seventeen companies, nearly all English, are engaged in this service, although in virtue of a recent Act, vessels flying the national flag are alone authorised to engage in the coast traffic. The majority of the crews are also required to be of Brazilian nationality, a condition which could not be complied with but for the facilities afforded to foreign sailors of becoming naturalised citizens.

In ordinary times about ten Atlantic liners arrive every week in the Brazilian seaports. The voyage from Lisbon to Pernambuco usually takes eleven days; but the Atlantic at its narrowest part, between the African and South American continents, could be crossed in two days and a half by a fast sailer, such as those engaged in the service between Liverpool and New York. Direct telegraphic communication is maintained by submarine cables between Pernambuco, Europe, and the United States. A line 3,720 miles long skirts the seaboard from the Amazons to the Plate estuary.

EDUCATION—RELIGION.

Public instruction could scarcely make much progress in a country in which the great majority of the labourers have, till recently, been slaves. Nevertheless some schools and colleges had already been founded by the Jesuit missionaries under the colonial administration, and during the second half of the eighteenth century the Marquis de Pombal had caused "royal" educational establishments to be opened. But the great mass of the people still remained unlettered.

In 1834, seven years after the promulgation of the first law regarding public instruction, in the whole province of Rio de Janeiro there were only 30 schools, attended by 1,369 of both sexes. Since then a great improvement has taken place, although recent statistics show that even in the most advanced provinces a great part of the young are still receiving no instruction. In 1872 about 23 per cent. of the males and 13 of the females could at least read, while one negro in 1,000 knew the alphabet. Twenty years later it was estimated that over three-fourths of the whole population of both sexes, whites, blacks, and coloured, were still ignorant of the rudiments of knowledge. Many of the rising generation, however, are self-taught. In the central States of Minas Geraes, Goyaz, and Matto Grosso, most of the *curandeiros* ("healers," doctors) have qualified themselves by the study of medical works without any instruction, and these are often remarkably successful in the treatment of their patients. The negroes, who are stated to excel the whites in the musical faculty, have grouped themselves in musical clubs, numbering many thousands.

The high schools are supported by the State, always excepting various separate establishments founded by the Jesuits at a distance from the large cities, such as that of Itu in the State of S. Paulo, and the college of Caraça in Minas Geraes. In Rio are centred most of the higher faculties—College of Physicians, School

of Pharmacy, Normal School, College of the Fine Arts, Conservatoire of Music, Lyceum of the trades and crafts, military and naval schools, without, however, forming a university body. Pernambuco, Bahia, S. Paulo, and Ouro Preto have also their medical, law, and mining colleges. In all these institutions French is, to a large extent, the vehicle of instruction. In the public libraries, also, the demand for French was, till recently, greater than for Portuguese works.

Printing was introduced in 1744, but the first press lasted only three years, having been destroyed by order of the central government. Then the country remained without a printing office till 1808, when the fugitive King of Portugal introduced another press in order to publish his edicts. Newspapers had a hard struggle till the period of independence, and the history of their first years is a dismal record of banishments, imprisonments, and even executions of their editors. After that the number of periodicals increased steadily from 31 in 1828, to 271 in 1876; during the next decade they had more than doubled.

Formerly the Church was all-powerful in Brazil, where the Inquisition, introduced in 1702, persecuted heretics with a blind rage. Yet in most cases heresy consisted, not in the profession of heterodox doctrines, but in the strain of Jewish blood in the veins of the victims. After the Declaration of Independence the "Roman Catholic and Apostolic Church" maintained its ascendancy, and the public exercise of all other religions was severely interdicted.

But the revolution which overthrew the empire also separated Church and State, while continuing their incomes to priests on duty. Nevertheless, there have been frequent collisions between the two powers, and even in 1892 the legal suppression of the crucifix in the law courts gave rise to fierce demonstrations against the "freethinkers."

The vast majority of the population professes the Roman Catholic faith, and in the returns for Rio de Janeiro in 1892 less than one per cent. declared themselves of a different or of no religion. But indifference in religious matters is spreading, and despite the thunders of preachers, freemasonry is acquiring multitudes of adherents in all the large cities. The clergy finds it difficult to obtain sufficient recruits from the native white and black populations, and has to be complemented every year by foreign priests, nearly all Italians.

On the other hand, the Brazilians display great public spirit in the organisation of their charitable institutions. As in England, their hospitals and asylums are independent of the State, and supported by voluntary contributions. An appeal "in the name of all our suffering brethren" never fails to produce subscriptions sufficient to provide amply for all the hospitals throughout the Republic.

The outward forms of the *irmandades* ("brotherhoods") are still religious, and at the official gatherings the "brethren" wear the monkish habit as of old. But each association is organised in its own way, and its operations are carried on altogether independently both of Church and State. In Rio these benevolent societies administer a collective revenue of several hundred thousand pounds.

GOVERNMENT AND ADMINISTRATION.

In accordance with the stereotyped formulas of modern constitutions, all Brazilians are recognised as equal before the law. The right of association, full freedom of speech, and of the press, are also recognised, except in the case of anonymous publications. Letters passing through the post are inviolable, and all professions are open to all citizens. The Republic ignores the old privileges of nobility, suppresses all orders and honours instituted by the monarchy, and abolishes all aristocratic distinctions. Yet in few countries are barons, viscounts, and marquises more plentiful, not to speak of councillors and doctors. The old régime lavished honours on staunch supporters, and, as is said, still more on reconcilable opponents; and, since the fall of the empire, both classes have preserved, if not their allegiance to the exiled princes, at least the high-sounding titles which they owed to the imperial favour.

Besides all natives, citizenship is extended to all the children of Brazilians, to the illegitimate children of Brazilian mothers born abroad on taking domicile in the Republic; moreover, to foreigners owning land in the country, or marrying Brazilian wives, or having children in Brazil, unless they formally declare themselves of another nationality.

One of the first acts of the revolution was to extend citizenship to all children of foreign residents who for the space of six months should omit to claim their original nationality in distinct terms. Thus was solved the question affecting immigrants, which had been for so many years a bone of contention between political parties. Nothing, in fact, could be more unreasonable and inconsistent than the treatment of foreign settlers since the middle of the century. They were urgently invited to come over; they received a free passage, allotments of land, at times even advances in money and live-stock; but they were denied citizenship, and treated almost as outcasts. Before 1863 marriage was interdicted to them, and in 1881, not one had yet obtained a seat in the provincial assemblies, not even in that of Rio Grande do Sul, whose trade and industries they controlled.

The electorate, both for the several States and for the Republic, comprises all citizens twenty-one years old who are not mendicants, illiterate, or engaged in pursuits incompatible with freedom of opinion. Thus are excluded all soldiers, except the military students in the higher schools, and all members of religious communities bound by the vow of obedience. All pleading religious scruples as a ground of exemption from the discharge of duties imposed by law on other citizens declare themselves *ipso facto* barred from civic rights.

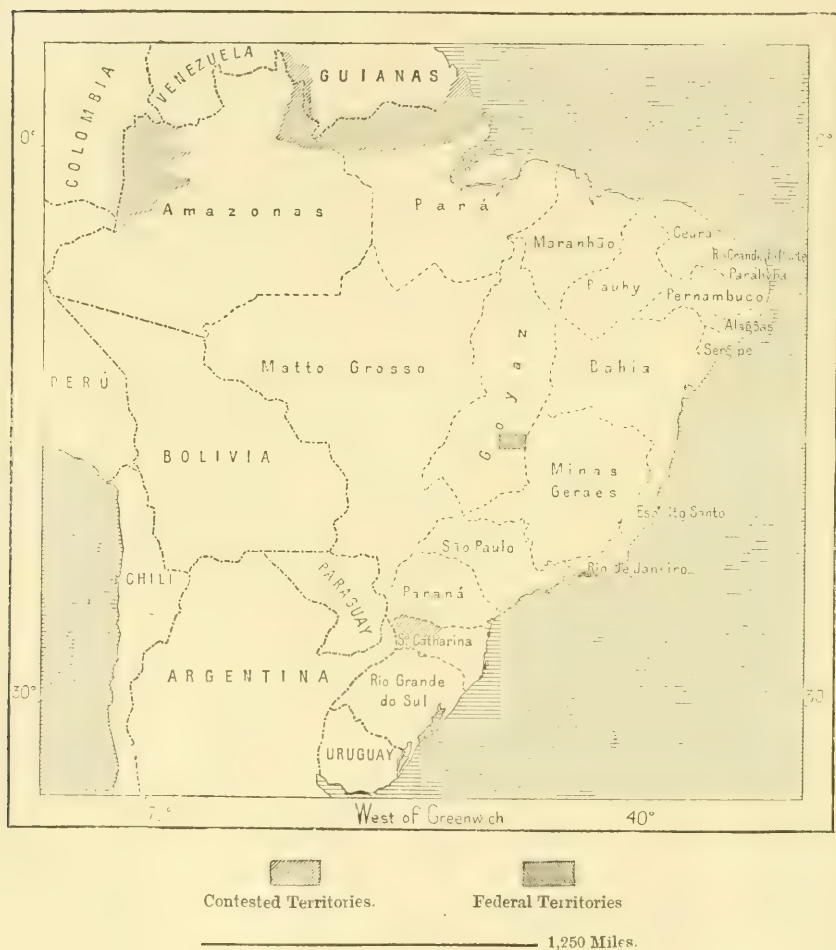
Despite the primary importance attached by the constitution to the exercise of the suffrage, official source of all public authority, the privilege appears to be little appreciated, and absence from the voting booths is almost universal. Even in the capital nearly 100,000 electors have been known to abstain from voting.

When the Federal Republic was proclaimed, the nation was not consulted as to the political groups which should constitute the federation. The names of the administrative divisions under the empire were merely changed; and from "pro-

vinces" they became "States," although these divisions were singularly defective in every respect, in no way corresponding to such as would be formed, had the people themselves been consulted. Apart from Amazonia and Matto Grosso, which are in reality not States so much as territories awaiting future settlement, the vast region of Bahia has for neighbours the two former provinces of Alagoas and Sergipe, one seven the other eleven times smaller. It may, however, be presumed

Fig. 123.—POLITICAL DIVISIONS OF BRAZIL.

Scale 1 : 45,000,000.



that the fluctuating and ill-defined frontiers of so many conterminous States may still be rectified, in accordance with the physical and social conditions.

Possibly new groups will be constituted, which may have the effect of shifting the present political equilibrium. But meantime it seems surprising that, in a nation connected by federal ties, the old royal decrees, rather than the wishes and interests of the people, are consulted in distributing the inhabitants of the Republic in distinct and autonomous political divisions.

Each of the twenty States has its two chambers and its president; and each passes special laws subordinate to the general principles of the constitution of the United States of Brazil. All lands and mines not yet disposed of belong to the nation, those only excepted which may seem indispensable to the Union for frontier defence, or for the construction of strategical routes and railways of general interest. Two conterminous States may conclude special conventions between themselves, provided they involve no political element. But they cannot declare war against other States, nor refuse to accept as legal tender the metal or paper currency recognised by the Union, nor reject any legislative, administrative, or judiciary measures proclaimed by the Federal Republic. In respect of foreign matters the twenty States act in concert and have no individual political status.

The Chamber of Deputies, which assembles at Rio de Janeiro, pending the foundation of a future federal capital on the Goyaz plateaux, consists of popular representatives, elected in the proportion of at least four members for each State and for the neutral municipality of the republic; and in the general proportion of one to every 70,000 of the inhabitants. As in the United States of North America, which have served as a model for the Brazilian legislators, the Chamber of Deputies corresponds numerically to the strength of the several States measured by the test of population, whereas the Senate represents the States as equals by right, irrespective of the number of their inhabitants. The Senate accordingly consists of 63 members, that is to say, three for each State and for the neutral municipality. As in the northern Republic, the members of the Senate retire by rotation. Its legal duration being for nine years, one-third are replaced by new members after three years, and at the end of the sixth year fresh elections take place for the second third of the Senators.

Although the president and vice-president were raised to power in virtue of a military revolution, the constitution provides an elective and popular origin for the two chiefs of the executive. Both are nominated by direct suffrage, and by an absolute majority of votes; but failing such a majority, congress decides. Four years is the period fixed for the exercise of the presidential power, which cannot be held by the same person twice consecutively. The president appoints and dismisses the Ministers of State at pleasure; he commands the land and sea forces, and appoints the heads of the civil departments dependent on the federation, the members of the Supreme Court of Justice, the ambassadors and consuls, declares war and concludes peace. He approves and publishes the laws passed by congress; but he possesses the right of veto, sending back questions to be again discussed by the chambers, and decided not by a bare majority, but by a substantial majority of two-thirds. The Senate on its part enjoys the almost delusive privilege of trying the president if impeached by the Chamber of Deputies. In point of fact the head of the Republic is armed with monarchical powers far greater than those claimed by the emperor. Thus the Judiciary body, which by a legal fiction is held to enjoy an influence equal to that of the legislative and executive bodies, is in reality in the hands of the president, who names all its members.

It is noteworthy that Auguste Comte's positive school had much to do with the revolution which overthrew the empire. His teachings had made great progress, especially in the military institutions, and to the zeal of certain positivists engaged in the revolutionary movement must be attributed several decrees issued during the first weeks of the Republic. Such were the separation of Church and State; the institution of the national feast of July 14th coinciding with that of the French Republic; the adoption of the mottos "Order and Progress" for the national flag, "Safety and Fraternity" in official correspondence.

But political morals are unaffected by such empty formulas. The Brazilian constitution may model itself almost slavishly on that of the North American Union; but it will fail to infuse the Anglo-Saxon spirit into the Brazilian populations. Each article of its "magna charta" will still be interpreted in accordance with the habits of thought, the traditions, usages, and passions of the half-caste Portuguese inhabitants of South America.

Thus it has happened that the royal powers granted to the president of the United States, and consequently to the head of the Brazilian Republic, have rapidly led in the latter State to a pure dictatorship. From the very first, however, the outcome of the revolution was of its essence a military autocracy. The army had long grumbled at being kept aloof, and when the enfeebled emperor ceased to take an active part in the administration, the deeply mistrusted military commanders were studiously removed to great distances, and virtually banished even to insalubrious regions, such as Upper Amazonia and Matto Grosso. Nevertheless, the army, elated at its triumphs over Paraguay, had long resented its subordinate position, and now clamoured for the first place in the management of affairs. The few men who controlled the republican movement, taking advantage of this feeling, offered power to the military leaders in exchange for the name of "Republic," and the revolution, more apparent than real, was effected without bloodshed as a simple "transformation scene."

Since the end of the empire, Brazil has been ruled by soldiers, and in 1893 more than half of the provincial governors were army men. But the navy, which had also a share in the glory of the Paraguay War, especially in forcing the passage of the rivers, now found itself neglected in the distribution of power. To the consequent rivalry between the military and naval forces, diversely influenced by the pressure of the civil element, must be attributed the sequence of events which were brought to a temporary close by the collapse of the revolt in the spring of 1894.

At the same time the army is not a force constituted by the exercise of any legitimate national function. Although there exists a law of conscription by lots, the regiments are recruited by voluntary engagements legally limited to a period of six months, during which the men are in the pay of the State. Most of the rank and file are men of colour, while the officers are mainly whites, or regarded as such. During the Paraguay War, Brazil had as many as 70,000 soldiers, including the mobilised national guards, the police, and frontier garri-

sons. Since then the effective has varied from 15,000 to 20,000, capable, in time of war, of being rapidly raised to 30,000. The national guard, which has a purely fictitious existence, nominally comprises a million or so of citizens.

Up to the recent outbreak the navy had been maintained at a considerable strength. Under the empire most of the vessels were commanded and manned by English, Americans, and other strangers. At present recruits for this service are raised in Brazil, although the vessels are still, for the most part, built in Europe. Ships of small size alone are launched in the various government dockyards at Rio, Bahia, Pernambuco, Maranhão, and Ladario, near Corumba.

The struggle with Paraguay cost Brazil £60,000,000, a sum which about represents the present amount of the national debt. The interest on foreign loans is payable in gold, and Brazil has hitherto punctually met all its engagements,

Fig. 124.—PALACE ON FISCAL ISLAND—CUSTOM HOUSE, BAY OF RIO.



although the annual budget usually shows a deficit. Most of the revenue is derived from customs, which increase by 60 per cent. the mean value of the imports. The expenditure is chiefly devoted to the army and navy.

Thanks to a recent fiscal arrangement, by which a share of the customs is apportioned to the several States, several of these are in a flourishing financial position. Thus the receipts of Minas Geraes have increased threefold during the last twenty years, while the expenditure has advanced at a much slower rate. Similar relations prevail in Rio de Janeiro, and even in the almost uninhabited State of Amazonia, which has no debt, and a considerable yearly excess of income over outlay.

Other States are less prosperous, and Goyaz, Piahy, and Parahyba are unable to balance their accounts without aid from Congress. But nearly all depend for a part of their income on the love of gambling which pervades Brazilian society.

The drawing of State lotteries is a matter of personal interest for millions of the natives. In Rio de Janeiro and the other large cities kiosks are erected at every street corner for the sale of tickets.

The smallest of the administrative divisions has preserved its religious designation, *freguezia*, which originally meant a parish, or "gathering of the faithful." In 1887 the whole empire comprised 1,886 of these *freguezias*, some forming merely a town ward or district, others embracing territories of vast extent. On

Fig. 125.—MUNICIPALITIES OF THE STATE OF RIO DE JANEIRO.

Scale 1 : 4,000,000.



an average they occupy a superficial area of 1,700 square miles, or two-thirds of a French department.

From the religious standpoint, Brazil is divided into twelve dioceses, two archbishoprics (Bahia and Rio de Janeiro), 19 vicariates general, and 233 ecclesiastical comarcas. In the civil administration one or more *freguezias* are grouped in *termos*, which coincide, for the most part, with the *municípios*. Nevertheless, some of the *termos* are themselves divided into "municipalities," a division which, despite its great extent, answers best to the French commune.

In the official statistics the population is enumerated by municipalities. Hence the populations of towns figuring in most geographical works are often distributed over vast spaces several thousand square miles in extent. The inhabitants grouped in the central nucleus, officially called *cidade*, "city," or *villa*

“town,” are often less than a tenth of the number given for the whole *município*. Hence travellers arriving at a “city” with a reputed population of 10,000 or 20,000 find themselves sometimes landed in a wretched village, where it is not always easy to procure “accommodation for man and beast.”

In 1877 Brazil comprised altogether as many as 910 municipalities, of which 258 were classed as cities and 652 as towns. A group of municipalities constitutes a *comarca*, which is defined to be an area of territory subject to the jurisdiction of a *Juiz de Direito*, and which is divided into a number of *freguezias*. Hence some of the *comarcas*, especially in the less thickly peopled regions, cover a space of thousands of square miles.

Other divisions prevail in the military and naval administrative departments, while for trade purposes and the collection of customs Brazil is grouped in five prefectures—two fluvial (Amazons and Matto Grosso), and three maritime, those of the north, centre, and south.

In the appendix is a table of the twenty States, with approximate areas and populations.





CHAPTER XV.

PARAGUAY.



F the South American States, Bolivia and Paraguay alone have no seaward outlet through their own territory. But, alike in this, these Hispano-American Republics differ greatly in many other respects. One occupies the summit and steep scarps of a plateau 12,000 or 13,000 feet above the sea; the other, comprised like a "Mesopotamia" between two large rivers, is a region of plains and low hills, of marshes and woodlands.

But the two countries present certain analogies in their historic evolution. In both regions the nation was developed in seclusion from the outer world, the Bolivian on the islands and around the shores of Lake Titicaca, the Paraguayan in the clearings of the great sub-tropical woodlands. Their growth has been compared to that of the pulp round the hard nucleus of stone fruit. Thus may be explained the fact that Bolivia lost the strip of territory on the oceanic slope of the Andes which her neighbours of the Pacific seaboard had at first left in her possession. This territory did not belong naturally to the State, but was a sort of dependency assigned to it by a purely conventional arrangement, and of which it was deprived by a fresh convention when the original conditions were changed. Paraguay also still remains confined to her forest glades, the population, enjoying the advantages of a seaward outlet, having naturally gravitated towards other centres of attraction.

A chief factor in the historic evolution of Paraguay was the ascendancy of the Jesuits, who, however, were absolute masters only in the southern part of the country. Their dream of universal empire could never be aught but an utopia in the Old World, where they had to struggle with an innovating spirit, diametrically opposed to their ideal. Yet even here they did not despair of success, and there were times when they might seem on the eve of acquiring the control of the destinies of Europe, and of bending mankind to the yoke which they had framed.

But having failed before the ferment of free thought in Europe, they might

still hope to mould at pleasure the docile savages of South America, and in the seclusion of that region, far from the jealous gaze of a perverted society, constitute a new world obedient to the disciplinary laws introduced by them. The scheme embraced the whole continent. Stationed at first in their college of S. Paulo on the edge of the Brazilian plateau, and constantly recruited by zealous missionaries drawn from all Christendom, they gradually subdued the vast inland regions as far as the foot of the Andes and the entrance to the Amazonian plains.

HISTORIC RETROSPECT.

But the Jesuits had not arrived alone in these new lands, and they soon found their work hampered by the presence of restless and unsympathetic white neighbours. The Portuguese adventurers, the first to arrive, aspired to other things besides creating model empires, and thought of little except enriching themselves by the capture of slaves and the quest of gold. Hence endless conflicts with the "Fathers," who were gradually pressed back to that part of the continent of which the Paraguayan republic now occupies the centre. Here they at last found the material suitable for their purpose, meek and pious neophytes, whose daily existence might be regulated by the sound of the church bells. The whole nation was transformed to a devout flock, telling their beads and bending in worship before the altar.

But the modern spirit continued to dog their steps, and they were fain to abandon these Paraguay missions, as they had to fly from those of Guayra. Nevertheless their impress was left on the nation whom they had reduced, and even on the surrounding populations who had not been brought directly under their sway. By constituting these sequestered communities, cut off from all intercourse with a profane world, they had roused a feeling of antagonism, which led to the inevitable conflict. A section of mankind cannot keep aloof from their kindred, and the wider the gap produced by education and pursuits, the more unavoidable becomes the clash.

A recent illustration of this truth is supplied by the history of the North American Mormons, who fell back from wilderness to wilderness before the steady advance of the backwood settlers in the Far West. At last they established themselves in a basin enclosed by lofty mountains, and defended from invasion by saline tracts, rugged gorges and waterless ravines. Here the "Latter-Day Saints" thought themselves secure, and here, like the Jesuits, they realised that vision of their dreams, a perfect community modelled on the heavenly Jerusalem. But one day their implacable enemies, the "Gentiles," burst upon their seclusion, tore their laws to shreds, and profaned their temples.

Even after the expulsion of the Jesuits, the Spanish colony of Paraguay kept apart from the Buenos Ayres government, of which it was an official dependency. Hence when the Hispano-American provinces separated from the mother-country, the city of Asuncion, which had already revolted in 1811, refused to group itself with the other Argentine colonies under the hegemony of the former capital.

After some years of agitation, during which its independence had never been threatened, Paraguay submitted to the dictatorship of a master, who succeeded in closing the land as hermetically as China and Japan were at that time closed to the "western devils." Under this ruler, Caspar Francia, Paraguay continued for twenty-six years (1814—40) to be inaccessible to the outer world. This strange personality, born of a French father and half-caste creole mother, taking Robespierre as his model, a theologian and jurist by education, never allowed himself to be for a moment turned aside from the line of conduct which he had proposed to follow. An ardent but exclusive patriot, he isolated Paraguay from the rest of the world. He wished his people to live in peace, and to progress materially in absolute ignorance of foreign revolutions. Despite his earnest desire to see the Hispano-American communities freed from the Spanish yoke, he permitted no Paraguayan to take part in the war of emancipation, and refused to send envoys to the various congresses which assembled during the fifteen years of the struggle. Absolutely disinterested, he sought only the advancement of the common weal, and established a strict monopoly for the sale of maté, lumber, and all other produce.

Indifferent to all relations with foreign powers, he broke even with the Holy See, declared himself head of the Paraguayan Church, abolished what remained of the Inquisition, suppressed the four surviving convents, modified at his pleasure the ecclesiastical hierarchy and even the liturgy, and appointed the parochial clergy. Hostile to the Jesuits, he nevertheless continued their policy, establishing a kind of theocratic system in which he was at once temporal and spiritual dictator, and certainly no ruler was ever better obeyed. Such was the terror, mingled with admiration, inspired by the aged recluse, friendless and unloved, whose "ear was at every wall," that no Paraguayan would have dared to utter his name, or refer to him except as *el Supremo*, or even *el Perpetuo*, as if he had already attained immortality. After his death he was *el Difunto*, "the Departed," in a pre-eminent sense, and it was long before the public ventured to speak of the august personage; at mention of his name everyone turned instinctively aside, as if still fearing the presence of some secret spy or informer.

The dictator was followed by others—Lopez the Elder, and his son, Francisco Solano. But times had changed; the population had increased with unheard-of rapidity; beyond the Parana the two Argentine provinces of Corrientes and Entre-Rios had been settled, and were now in direct relation with the European world. It was no longer possible for the two conterminous States of Paraguay and Argentina to avoid friendly or hostile contact.

Instead of remaining in her primitive isolation, Paraguay now needed a seaward outlet, to be obtained "by fair or foul means." Forming an alliance with Uruguay, which, being hemmed in between Brazil and Argentina, had identical interests, the president of Paraguay thought himself strong enough to try issues with his two powerful neighbours. He had the advantage over them of a well-organised army, amply furnished arsenals, and flourishing finances free of all public debt. Brazil and Argentina were invaded, but he was unable to reach the sea in time to help the Uruguayans, who, as the result of an internal revolution,

suddenly changed sides and took part with the Argento-Brazilians in repelling the Paraguayan invasion. The little Republic, encircled by the two rivers, Parana and Paraguay, as by a deep moat, held out for over five years against the allies. During this disastrous war, one of the most terrible on record, Paraguay sacrificed all her able-bodied men. Retreating inch by inch from one entrenched camp to another, from Humaita to Aquidaban, the heroic army, reduced in numbers, but animated by a patriotism of which the modern world offers no second example, still defied the enemy by whom it was vastly outnumbered. On the battle-fields the allies found little but dead bodies; nor all of these, for many, fighting lassoed round the waist by cords attached to the saddle-bow, were borne dead or dying from the field by their mounts. Prisoners tore the bandages from their wounds; the vanquished preferred death to bondage; the whole nation wished to perish, as Numantium had perished.

At last the manhood of the nation had almost entirely disappeared by war, famine, and cholera. None survived except invalids, the infirm, the women and children. Entrapped in a mountain gorge, the last heroic band fell with the dictator.

For many centuries, during which nevertheless so much frightful carnage had been witnessed, humanity had not suffered from such a terrible struggle, attended by such atrocious havoc and ruin. The utter destruction of this people, one of the best and kindest recorded in history, was primarily due to the enforced isolation in which the Paraguayan nation had been kept from the very first, and to the doctrine of collective and absolute submission with which it had been imbued by its spiritual and temporal rulers.

BOUNDARIES—EXTENT—POPULATION.

The present frontiers of Paraguay have been dictated by the conquerors. The eastern section, which constitutes Paraguay proper, is strictly limited by natural boundaries. Here the Rio Apa, constantly claimed before the war by the Brazilians as their frontier, now separates Paraguay from Matto Grosso. The great bend of the Parana above the Paraguay confluence encloses the republic on its east and south sides.

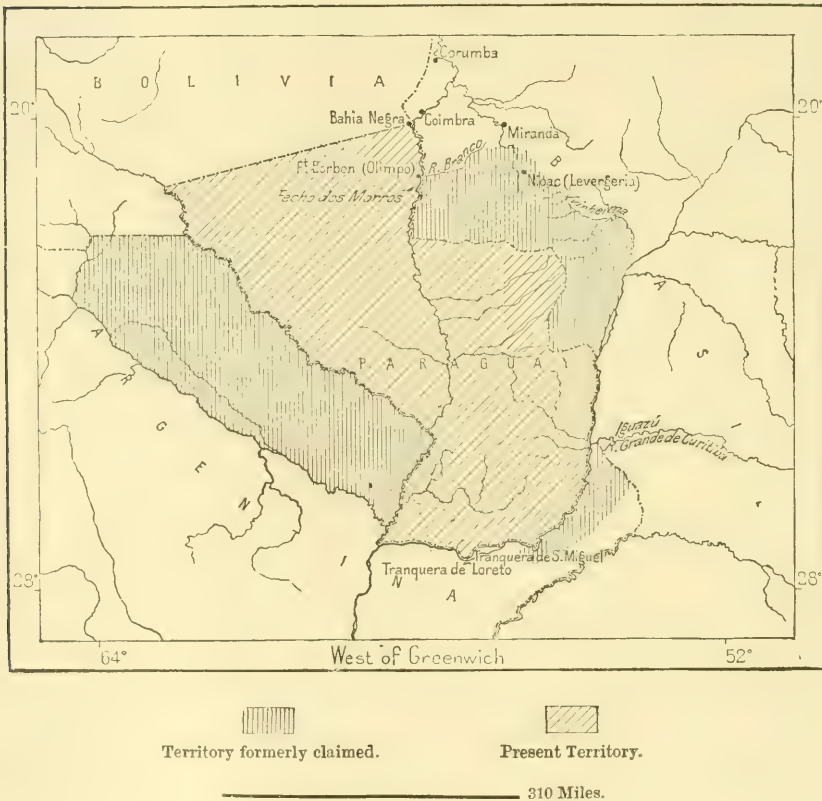
West of the Paraguay the whole of the Gran Chaco solitudes had been claimed by Argentina, which, having appropriated the territory of the Cis-Parana missions, now also wished to annex the Cis-Paraguayan section of the wilderness. But Brazil, whose obvious interest it now is to maintain an independent Paraguay as a "buffer State" against her powerful neighbours, failed to support the claims of Argentina, and the question, on being referred to the arbitration of the United States, was decided in favour of Paraguay. The Rio Pilcomayo thus became the parting line, and all the inter-fluvial territory between the Paraguay and the Parana was declared Paraguayan domain.

Thanks to this addition Paraguay no longer remains the smallest of the South American republics. But although larger in extent, she is greatly inferior in

population to Uruguay, having (1893) not more than 530,000 inhabitants scattered over an area of nearly 100,000 square miles. Most of this region is, in fact, an uninhabited wilderness, and the settled part is confined to a narrow enclave on the river between the desert and the forest. Asuncion, the capital, is enclosed by a semi-oval tract of cultivated land some 2,000 square miles in extent, and to this tract the true Paraguay is at present mainly limited. A small town and a few forest clearings are the only traces of man on the banks of the

Fig. 126.—FORMER LIMITS CLAIMED AND PRESENT LIMITS OF PARAGUAY.

Scale 1 : 14,000,000.



Parana. And this narrow domain enjoys little more than a nominal independence. In case of rupture with any of her powerful neighbours, Paraguay would be utterly helpless in the presence of her former conquerors.

PROGRESS OF DISCOVERY.

From the early days of the Spanish occupation Paraguay had attracted explorers, and the foundation of the city of Asuncion is even anterior to the definite settlement of Buenos Ayres. The colony of Paraguay had already been constituted in 1536, under Juan de Ayolas, and nearly the whole space at present

occupied by the Argentine Republic, Tucuman, Cordoba, Buenos Ayres, was governed from Asuncion. The navigable waters were surveyed as far as Matto Grosso, and the mainstream was brought into connection with the Andean valleys by routes traced across the plains of Bolivia.

But, beyond the names of the regions traversed, and the most summary reports on the general relief of the land, Spain communicated nothing to Europe on the subject of her possessions in the centre of the continent. All that was known came from the Franciscan and Jesuit missionaries, who lived in the midst of the aborigines. The true character of the country was not revealed till the close of the eighteenth century, thanks to the explorations of Azara, who spent twenty years visiting every part of the Plate river and its affluents. Towards 1821 Aimé Bonpland, carried off by the soldiers of Francia, was compelled, much against his will, to continue for nine years his botanical researches, completed since the war by Balansa. Rengger and Longchamp were also forcibly detained for several years in Paraguay, which benefited by their studies. Later a few sailors and diplomatists received permission to ascend and descend the course of the Paraguay, and the results of their explorations have also been published.

Leverger, a Frenchman who became a naturalised Brazilian under the name of Baron de Melgaço, began his survey of the river in 1846, and prepared charts of its valley from its sources to the Parana confluence. In 1853 the United States obtained permission for the *Water Witch*, under Thomas Page, to ascend the river and its Bermejo, Pilcomayo, and Otuquis affluents. Six years afterwards Mouchez also ascended the Paraguay during his great voyage of circumnavigation round the eastern part of the continent.

But the main problem of a practicable waterway by the Pilcomayo between Paraguay and Bolivia remained unsolved, and even now is but half solved. The journey is known to be possible, though beset with great difficulties and dangers. Not one of the numerous expeditions sent to explore the Pilcomayo has been entirely successful; but they have established the fact that, without extensive hydraulic works, this river can be of little service in facilitating the communication between the Plate estuary and the Andes.

Nevertheless intercourse between the surrounding peoples cannot fail, sooner or later, to be developed and facilitated across these low-lying watery plains. Progress is already being made from three different directions—from Bolivia by the settlement of the upland valleys; from Argentina by the gradual extension of tillage over the plains of Gran Chaco; lastly from Paraguay by the ever-advancing camping grounds of the woodman and the establishment of cattle runs on the open steppe lands. Although published in fragments and difficult to harmonise, the itineraries of explorers are nevertheless valuable documents already available for the future map of the Republic. At present little has appeared except the survey of the main stream of the Jujuy and of the other rivers explored by Bourgade, together with the official surveys of the northern frontier. Bourgade's map of Paraguay is certainly by far the best as well as the largest hitherto published. It is based on his own

observations made in the years 1887-88, on the hitherto unpublished documents of the Boundary Commission of 1871-73, and on the maps prepared by Mouchez and Toeppen. An excellent reprint of this map accompanies Mr. E. G. Ravenstein's English edition of Bourgade's work on Paraguay.*

PHYSICAL FEATURES.

Paraguay, forming geographically a southern extension of Matto Grosso, is traversed by a chain of heights which continue southwards to the watershed of the Parexi plateau. About the sources of the Apa, this divide between the Paraguay and Parana affluents is commonly known as the Sierra Amambay. One of its ridges, which, by arresting the Parana waters, gives rise to the Guayra Falls, takes the name of the Sierra Mbaracayu (Maracaju). These crests, forming the political frontier towards Brazil, are nowhere high enough to prevent hunters and *yerbateros* (yerba maté gatherers) from passing from one slope to the other. They were crossed by Sandalio Sosa and by Bourgade to the east of the sources of the Jujuy, and although not yet measured, the summits of the Amambay and Maracaju ridges would appear to fall below 3,500 feet. The expression *Cordillera de los Montes*, that is, "Forest Range," locally applied to them, shows that the chief obstacle to the exploration of the country is due not so much to these ridges themselves as to the dense tangle of vegetation covering their slopes.

South of the Maracaju bifurcation the divide is continued in the interior, not by a regular chain, but by a succession of heights and rising-grounds, hyperbolically called "sierras" and "cordilleras." Here and there the horizon is limited or indicated by a few *lomas* ("hills"), or *cerritos*, isolated eminences, and a last ridge striking across the bed of the Parana forms the Apipe rapids below Villa Encarnacion. But the whole region between the parallel of the Guayra Falls on the Parana and San Pedro on the Paraguay (24° S. latitude) continues to incline gently in the direction of the south. Towards the south-west corner near the confluence of the two mainstreams the elevated plateau falls abruptly in cliffs and bluffs limited by the shores of an ancient sea, which is now represented by lagoons, morasses, and grassy tracts scarcely rising above the fluvial level.

Sandstones prevail in most of the hilly ranges, while the plains are formed of argillaceous beds and sandy stones belonging to the tertiary epoch. In some districts are seen volcanic cones, such as the Cerro Tacumbu just below Asuncion, and farther east the Sierra d'Acay (2,000 feet) near the sources of the Mbuarapey affluent of the Tibicuary. Earthquakes are often felt, and numerous mineral springs rise in the neighbourhood.

Vast spaces are covered with a red earth, which in some places is several yards thick, and which is deeply ravined near the running waters. Some of the fertile tracts about Asuncion belong to this formation, which contains numerous well-preserved shells constantly washed up by the rains. As in S. Paulo, this red

* *Paraguay, the Land and People*, &c., by Dr. E. de Bourgade La Dardye, English Edition, edited by E. G. Ravenstein, 1892.

soil is extremely rich, and grows excellent tobacco. The black alluvia deposited by the inundations are also very fertile in some favoured districts; but in many places they consist of argillaceous layers, which when dry become very hard, forming a sub-soil impenetrable to the plough. Elsewhere the surface is strewn with a fine sand derived from the decomposition of quartzose rocks, and producing nothing but tufts of scanty grasses. In the hills all minerals, except iron and salt, are rare.

RIVERS.

The Parana belongs to the republic only on its right bank between the Guayra Falls and its confluence with the Paraguay, which in its lower course traverses the State to which it gives its name. The Paraguay flows in a sluggish sinuous stream about 1,000 feet broad in the normal direction from north to south. During the summer floods it rises over 20 feet above the Parana confluence, and at this period the flood waters cover the plains on both sides, stemming the current of the affluents, but developing no great lakes like those of Matto Grosso, except in the low-lying tracts above the confluence. It receives far more copious contributions from the east than from the west, a fact partly due to the extremely slight incline in Gran Chaco, where the flood waters spread out in vast shallow basins, and are thus exposed to immense loss by evaporation.

South of the Apa, forming the frontier towards Brazil, the Paraguay is joined on its left bank by the picturesque Aquidaban, and lower down by the Ipané and the Jujuy, the last mentioned being navigable by boats throughout most of its course, which is interrupted only by a single cataract below the superb cascade discovered by the Yerbateros in 1879. In the southern parts of Paraguay the largest eastern affluent is the Tibicuary, which winds in enormous bends through marshy plains, formerly a lacustrine basin, still represented by the extensive freshwater Ipoa lagoon below Asuncion.

On the right (west) side, the chief affluent is the Pilcomayo (Piscu-Mayu, "Bird-River"), which so many modern travellers have vainly attempted to thoroughly explore, although ascended in 1721, a great distance above the confluence ("364 leagues"?) by the Jesuit Gabriel Patiño with a party of seventy priests, Spanish soldiers and Guarani Indians. But Patiño, attacked by the fierce Toba nation, was compelled to return before reaching Bolivia. Twenty years afterwards Castañares, also a Jesuit, navigated the stream for 83 days without penetrating to Bolivia, and, during a second expedition, he was murdered by the Indians.

Then followed after a long interval the Bolivian expedition under General Margariños, which failed to get much below las Juntas, that is, the "Junction" of the two main head streams. The next year another party pushed farther down; but the current becoming shallower instead of deeper, the boats had to be abandoned, and the explorers retraced their steps from a point at an unknown distance above the Paraguay confluence.

In 1882, Crevaux, after his brilliant discoveries in Guiana, attempted to descend the Pilcomayo; but about midway he was massacred with nearly all his party by the formidable Tobas, who in the eighteenth century had driven back Patiño and killed Castañares. Crevaux was followed by Fontana, who surveyed the middle course of the river in the Toba territory; Feilberg, who ascended 160 miles to the rapids, which he was unable to surmount; Thouar and Campos, who descended beyond the point reached by Crevaux, and then reached the Paraguay by an overland route across the plains; John Page, son of the explorer of the Paraguay, who died in 1890, worn out by nine months of surveys on the Pilco-

Fig. 127.—THE PILCOMAYO.

Scale 1 : 4,000,000.



mayo; lastly, Olaf Storm, who in the same year overcame the rapids and then went astray in a sea of floating vegetation.

On the Bolivian frontier, as well as in its lower reaches, the Pilcomayo is navigable by river craft of considerable size; but towards its middle course it spreads over a level plain, where the current is too feeble to excavate a deep or permanent channel. In 1844 the Margariños expedition was arrested in a sandy plain where the stream, dammed up by a barrier of snags, ramified into about sixty branches with scarcely perceptible current, and even disappearing in the ground. During the floods the whole of the region is a vast *bañado*, "drowned land," "slough," choked with islets of floating plants. Lower down the incline

becomes more decided, and the water flows, not in a rocky bed, but over layers of *tosca*, an extremely tenacious white clay, probably saline, for the Pilcomayo discharges brackish waters into the Paraguay.

It was long supposed that its mouths had frequently shifted; but lateral channels, false rivers and creeks may possibly have wrongly been taken for branches of the Pilcomayo. The present mouth joins the Paraguay three miles below Asuncion, opposite the Lambaré bluff. But in 1721 the chief branch was

Fig. 128.—VIEW TAKEN ON THE PILCOMAYO.



stated to be "nine leagues," or about 26 miles away. The Rio Confuso, which reaches the Paraguay 22 miles above Asuncion, is a different river, and not an arm of the Pilcomayo, as shown by its much more saline water. But when in flood the two streams may perhaps communicate through the intervening *bañados*. On the other hand the Araguay-Guazu, explored in 1886 by Fernandez for 440 miles from its confluence with the Paraguay, probably branches off from the Pilcomayo about the middle part of its course. Both streams resemble each other in their

general aspect, temperature and slight degree of salinity, and the term Araguay (Araaquay) has been applied by the natives to the Pilcomayo properly so called.

It is now generally admitted that the Pilcomayo is not in its present condition navigable, and that it is consequently useless as a commercial highway between Bolivia and Paraguay. But some engineers have suggested that it might be made available by canalisation. Such an idea is pronounced visionary by Bourgade, who points out that it would involve an outlay only to be incurred in densely peopled regions, or on great international highways such as the Suez Canal. The cost would be enormous, without any prospect of adequate returns on the outlay. The population is too scanty in both regions to hope for any great development of traffic; nor are the surrounding districts suitable for settlement, as they consist for the most part of saline sandy wastes and marshy clays, unfit either for tillage, stockbreeding, or the permanent residence of the white race.

In its lower course below the Tibicuary, the Paraguay is joined on its right bank by the Argentine Rio Bermejo, whose red current flows a long way side by side without mingling with the whitish waters of the main stream. Beyond the confluence the Paraguay develops two great bends, one of which washes cliffs 20 feet high, where till recently stood the formidable Paraguayan stronghold of Humaita. A little farther on it joins the Parana through the *Tres Bocas*, three shifting channels of unequal volume. The tract, over 125 miles wide, which stretched along both sides of the Parana about the confluence, and which is still studded with shallow marsh waters, was certainly at one time the bed of an inland sea, where the two great rivers converged.

This basin had a double discharge through the Lower Parana and the Uruguay southwards to the Plate estuary. After the disappearance of the inland sea, the rivers long continued to wander over the plains in search of a decided channel. Even still certain marshy tracts in the lower part of the Paraguayan Mesopotamia have the meandering aspect of rivers that have overflowed their banks.

CLIMATE.

The almost uninhabited northern part of Paraguay is traversed by the tropic of Capricorn, so that the more settled southern districts lie entirely in the temperate zone with its alternating seasons, as in West Europe. Nevertheless, the natives scarcely recognise any contrasts except those of winter and summer. The transition is sudden, and the spring season is all the less noticed that most of the trees preserve their foliage throughout the winter. Drought far more than cold causes them to shed their leaves, and oranges, the characteristic fruit of the Paraguay gardens, ripen in winter.

The temperature ranges from torrid heats to the freezing point, and the grass sparkles with hoar frost, especially in the southern savannas exposed to intense nocturnal radiation. But these frosts do little harm except to the sugar-canes, whose tissues are disturbed by the sudden thaw at sunrise.

Like the temperature, the winds, which generally follow the course of the river either from north to south, or from south to north, are also subject to abrupt changes, which are much felt, especially by immigrants. The most dominant wind is a kind of sirocco from Matto Grosso, which in summer makes the atmosphere almost stifling, even at night. On the other hand the southern wind, at times confounded with the pampero, causes lung complaints, arrests the vegetation, and occasionally even destroys the crops. The pleasant easterly breezes, which temper both the hot and cold weather, are unfortunately of rare occurrence. The rains, far more copious in the east than on the western plains, fall usually at the equinoxes, and are frequently accompanied by thunderstorms and gales, called *ventarrones*. On the whole the country suffers more from drought than from excessive moisture.*

Dr. Bourgade, who made a special study of the climatic conditions, considers Paraguay to be a perfectly salubrious region, and well suited for European settlement. A perpetual spring prevails for nine months in the year, and although the other three months are undeniably hot, the heat is less scorching than it is in Matto Grosso, Venezuela, and many other parts of South America. Even in the hot season scarcely a week passes without heavy rains, which have the effect of refreshing the atmosphere and lowering the temperature.

Except small-pox, on the decrease since the introduction of vaccination, there are no epidemics, and very little malaria beyond the thinly peopled eastern districts, which are subject to an intermittent fever locally called *chuchó*. Endemics also are rare, but rheumatic affections, anæmia, and other disorders of the blood, due to defective sanitary arrangements, are common enough. In a word, this authority holds that "Paraguay offers a promising field for immigration, the climate being both temperate and healthy, a combination that is not always found." †

FLORA—FAUNA.

Paraguay belongs rather to the Brazilian than to the Argentine botanical zone, and its rivers are bordered by leafy forests resembling the *mattas* of Brazil. The trees, which present a great variety of forms, have for the most part an extremely close texture; hence they do not naturally float, and to form rafts they have to be made buoyant by means of reeds and wood with thick sap. They are also hard to burn, but yield an excellent charcoal. In an industrial region they would supply admirable building material, cabinet and dyewoods. The *caraguata*, a species of bromeliacea, yields a far finer and stronger thread than that of hemp. The *caranday* and other palms intermingle with the *araucaria*,

* Meteorological conditions of Asuncion:—

Lat.	Altitude.	Temperature.			Rainy Days.	Rainfall.
		Min.	Mean.	Max.		
25° 16'	330 feet	14° Fahr.	76°	101°	79	66 inches

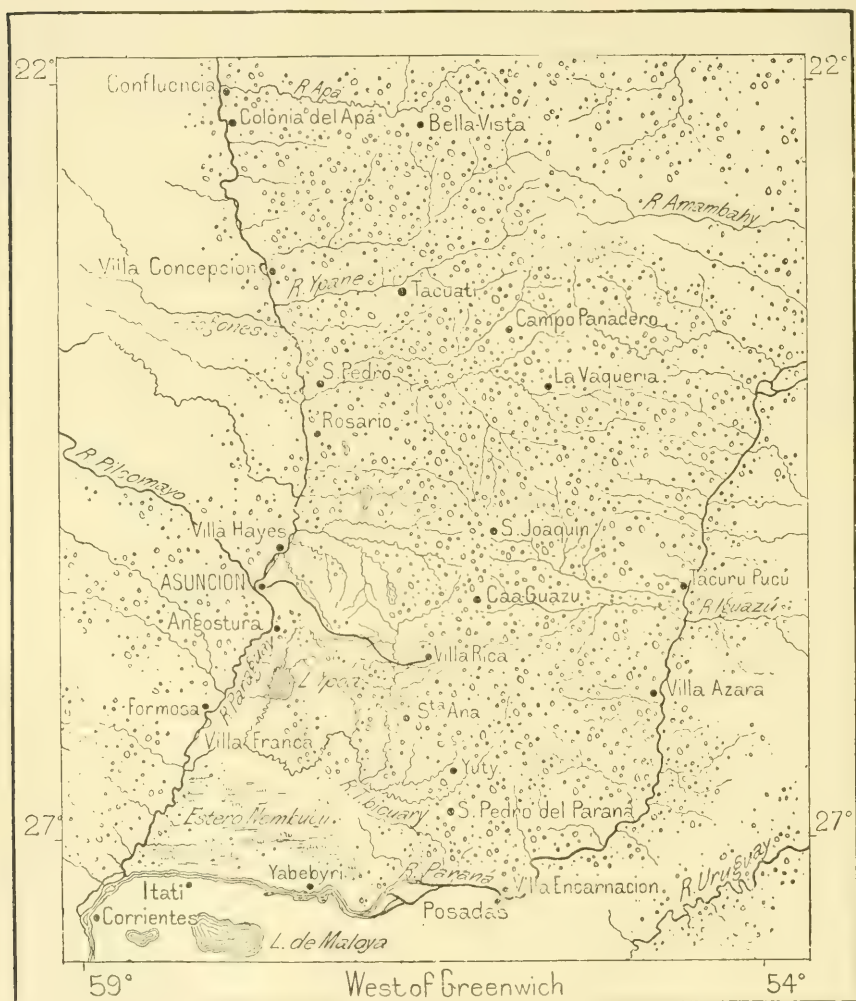
† *Op. cit.*, p. 73.

which in some districts is an exotic introduced by the Jesuits—hence its name, *arbol de las Misiones*, “Mission tree.”

To the arborescent flora of spontaneous growth the people are indebted for the staple of their export trade, yerba maté. Besides the forests, which cover the greater part of the region east of the Paraguay, stretches of savannas occur

Fig. 129.—FOREST AND CAMPOS REGIONS.

Scale 1 : 7,500,000.



here and there, nearly all occupied by waving seas of the *macega* grass, which grows to the height of a man. The hard stalk and sharp blades of this plant make travelling extremely difficult, and even dangerous.

Like the flora, the fauna belongs to the Brazilian zone. There are three species of monkeys, blood-sucking vampires, jaguars, pumas, tapirs, besides

the capyvara, boa, crocodile, termites, ants, and their enemy, the tamanoir. The ñandu ostrich frequents the campos, though in far fewer numbers than in Argentina. For certain species the Paraguay river forms a divide, and the faunas on either side present a great contrast, especially since the left bank has been settled by the white colonists, who seldom venture to enter the Chaco region on the opposite side. According to Garcilaso de la Vega, *Chaco* means "hunting-ground," and these plains are still roamed by multitudes of animals pursued by the wild Indians.

Of the carnivora by far the most formidable is the jaguar, which is said to be strong enough to carry off an ox or a horse. It avoids the haunts of men, and, despite the statements of some travellers to the contrary, will scarcely ever attack human beings. "Many a time," writes Bourgade, "I and my companions met one in the underwood, and it never failed to give a savage growl and to bound rapidly away; and often, as a group of them have collected round my encampment, I do not think they have ever approached within twenty yards of it—in fact, we became so accustomed to them that, when we were tired, we would let our fires go out, and ourselves fall off to sleep without the precaution of providing a sentinel. Ever and again we might be aroused by the cracking noise of a branch giving way under the weight of the brute, and on looking out we could see its eyes flashing in the darkness; but there was no fear of an attack." *

Another less known beast of prey is the aguara-guazu (*Canis Azaræ*), a species of wild dog sometimes over 30 inches long, with tawny hair and a black stripe down the back, very long legs, pointed nose, long bushy tail like that of the fox. It haunts swampy districts and hunts at night, making a peculiar hoarse bark which can be heard a great distance off. The natives assert that it will not hesitate to attack the jaguar, often with success.

Game still abounds almost everywhere, and according to Bourgade it would be scarcely possible to find another region where the sportsman could find more scope for his pursuits, so great is the variety of large and small animals, such as tapirs, crocodiles, peccaries, deer, antelopes, and many species of birds. "Could Europeans only know what is offered them in Paraguay, they would not be long in resorting to it as eagerly as they now make their way to Scotland or the Caucasus." †

INHABITANTS—THE GUARANI.

In Paraguay the great bulk of the aborigines were of Guarani stock, and the inhabitants of the towns and settled districts are still mainly Guarani half-breeds. Even before the arrival of the Jesuits their civilisation must have given them a certain ascendancy, for the Guarani language was sufficiently diffused to be adopted as the *lingua geral*, or common speech amongst the heterogeneous populations between the Oyapok and Paraguay rivers. The "general language" had

* *Paraguay, the Land and People*, &c., p. 64.

† *Id.* p. 68.

its origin, not in the Jesuit establishment of Porto Seguro, as stated by Martius, but in the native market-places, whence it spread from tribe to tribe.

In the eastern forests there still survive a few peaceful groups of Coaguas (Coyagua) and other Indians, who keep aloof, although conscious of their kinship with the other Guarani, whose religious ceremonies, bequeathed by the Jesuits, they imitate in a rude way. To the same stock belong the Apitares ("Inland People") a nation of potters and weavers, who occupy the territory between the sources of the Jujuy and the Guayra Falls.

The Guarani are amongst those aborigines of America who approach nearest to the Mongolic type. Nearly all of short stature, averaging about 4 feet 2 or 3 inches, stout and thick set, with broad chest and shoulders, and yellow-brown complexion, they have a round face with low narrow brow, slightly oblique eyes and coarse black hair.

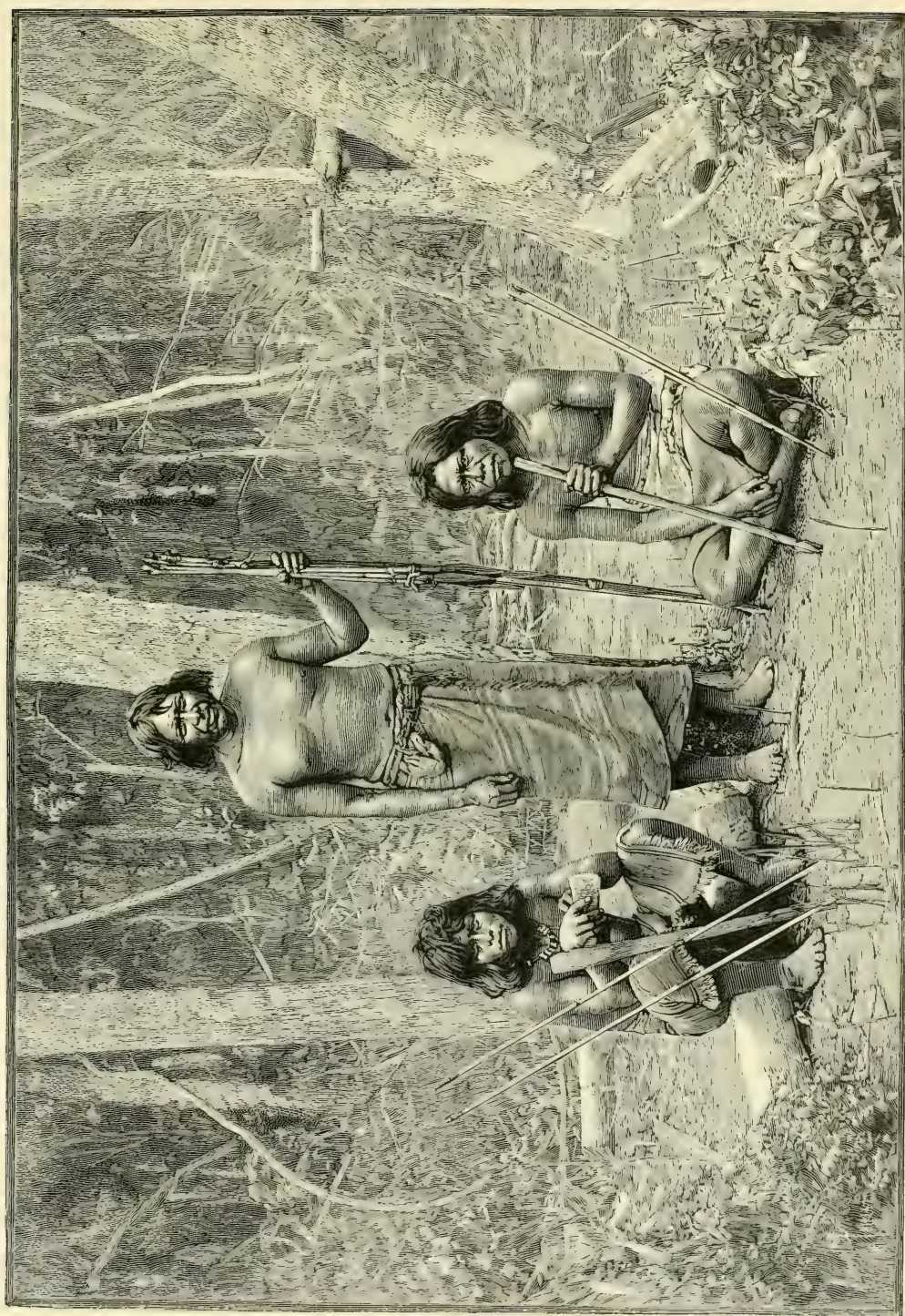
On the Paraguay above Asuncion dwelt the Payaguas, a vigorous race of fishers, taller than the Guarani, with narrower features and more delicate frames. Most of them perished in the incessant wars with the Spaniards, and the few survivors were removed to Asuncion, where, before the war, they still numbered about 500; but nearly all fell in the various battles, and in 1878 only 17 remained of the whole tribe. They were excellent craftsmen and even artists, designing elegant arabesques and fictile vases, modelling in clay or carving in wood statuettes with extremely life-like expression. The Paraguay language, which differed fundamentally from the Guarani, was so difficult to pronounce, that no Paraguayan could ever learn it. Certain words resembled deep sighs far more than the sounds of articulate speech.

The Lenguas and the Mbayas, members of the Guaycuru family, have not entirely disappeared, a few still surviving in Chaco, opposite Villa Concepcion. In the same district, but a little farther north, facing the Apa confluence, live the Angaites, who still number about 1,500. They are a remnant of the warlike tribes, who in the early days of the settlement surrounded and massacred Ayolas's little armed band.

THE ABIPONS AND TOBAS.

Few also survive of the famous Abipon nation, who down to the middle of the eighteenth century still occupied a vast territory in the south of the present Paraguay and beyond the Parana, as well as in Gran Chaco. Although never very numerous, at no time mustering 1,000 fighting men, they were much dreaded by the settlers, especially when they had learnt towards the middle of the seventeenth century to train and mount the horses introduced by the Spaniards into the pampas region. In about fifty years the Abipons with their Mocovi allies were stated to have captured about 100,000 horses from the whites. "The land is ours," they said, "and all that it produces belongs to us."

These terrible warriors had no chiefs, properly so called; the leader in their



GROUP OF ANGAITÉ INDIANS, NORTH CHACO.

predatory expeditions was an equal, whose strength, skill or energy inspired confidence, but who after the battle enjoyed no further privilege. They hunted the jaguar and eat its flesh in order to assimilate its strength, and for analogous reasons despised the flesh of peaceful animals. They were firm believers in metempsychosis, supposing that cowards and bad people passed into the bodies of noxious reptiles, while they themselves became the associates of the teal who hovered in flocks above the lagoons. Towards the middle of the eighteenth century they became Christians, but since then they have ceased to exist as a separate nation, being either merged in the surrounding populations, or swept away by epidemics.

The Tobas, old allies and perhaps kinsmen of the Abipons, not only still survive but even maintain their independence as a powerful and aggressive nation. They have often attacked the Paraguayan and Argentine settlements in Chaco, and the disastrous end of more than one expedition to the Pilcomayo valley shows how dangerous it is to enter their territory. They roam both sides of that river far to the north and south, and they have been met in the whole region from the banks of the Paraguay westwards to the foot of the Andes. They are a tall race, from 5 feet 6 inches to 6 feet high, with thick skin "like an ox-hide," so that they can walk even on thorny ground without sandals. From the marshy nature of the land they have acquired the curious habit of always, even on dry ground, raising the foot at every step vertically to the level of the knee. In the central regions they still insert wooden discs in the ear-lobe, whence the term *Oregudos* and *Orejones*, "big-eared," applied to them as well as to others in Amazonia by the Spaniards. The women tattoo themselves with straight and circular lines in blue and red, and apparently also dye the hair, which passes from the normal black to a chestnut, and even a yellow shade.

The Tobas cultivate no land, lead the nomad life of hunters and fishers, are much given to drunken orgies, and from childhood upwards are habituated to scenes of bloodshed. Through filial pity the children often despatch their sick parents, and after the battle the warriors bring the mangled remains of the slain to their women, reserving the head and hair for themselves.

When a woman dies mother and infant are buried together. On reaching the age of puberty, girls are secluded for a few days, and then entertained with a great feast, accompanied by much singing, music and dancing. Amongst the Tobas the marriage rite is extremely simple. The suitor accepted by the young woman's father goes off to the hunt, kills some large game, and lays it at the feet of his betrothed, as a proof of his strength, courage, and power to support a wife and family. Married folks sleep with their feet turned to the east, in order that the sun may shine on their soles and teach them to walk in the right path, for the day-god diffuses all virtue through his rays. The Tobas are strict monogamists, the women being of an extremely jealous temperament and admitting no partner in the domestic circle. At the least sign of rivalry the matter is settled by a duel, which often ends fatally. Stripped to the waist, the

loins girdled with a jaguar skin, the two furies arm themselves with a sharp bone or some other cutting implement, which they seek to plant in the breast or body of their antagonist, the men assisting with imperturbable gravity at the deadly combat.

Among these Toba Indians are many Hispano-American refugees, who have made their escape from Paraguay, Corrientes, and Santiago. But they are not easily detected, except by the hair on their face. "Men who have but a little white blood in their veins, and only a few points of the European type, become still less distinguishable in the costume of Adam before the Fall and after years of an Indian life. A youth, however, who had been stolen when a child, had retained his natural light-brown hair, and his face left no room for doubt as to his parentage. Another Christian was a chief. He was a certain Vincenzino, formerly the manager of an estancia at Santiago, where he was well known. He was a fine tall man, sunburnt, and with a short grizzled beard. He uttered very few words, and affected to be unable to express himself in Castilian. This was an artifice to avoid rousing the suspicion of the Indians, by whom Indianized Christians are forbidden to speak in an enemy's language that is not understood by themselves. Such Christians, therefore, remain mute and motionless as statues.

"Fortune for a long time has favoured the Tobas, who occupy the best lands on the banks of the Parana and Paraguay, being about sixty leagues, or, if measured by the windings of the river, a hundred. By secret trading with Corrientes and the Paraguayan Republic, they have provided themselves with firearms. Moreover, being farthest from the continually advancing Christian frontier, they receive a considerable contingent of the convicts, of whom I have already spoken. In this way the Vilelas and the Chiulipos have become mixed with them, and the case will be the same with the Mocovitos, who live in the south-west, along the frontiers of Santa Fé and Santiago, and whose language is not dissimilar, many words being identical." *

But these Gran Chaco Indians are not men of many words, and Mr. Knight witnessed a scene on the banks of the Paraguay, which was highly characteristic of their taciturn disposition. "We saw four Indians come stealthily down to the bank, armed with long lances. Then, lying down among the reeds, they gazed silently into the water till they saw some big fish pass by, when, with wonderful skill, they speared them one after the other, and threw them on the bank. Next they lit a fire, roasted the fish they had caught, and devoured them. This done, they picked up their weapons, and crept back into the woods as noiselessly and stealthily as they had come. The whole time—some three hours—that they were on the river-bank, not one of these men spoke a word; they gave the necessary directions to each other by slight inclinations of the head only. As soon as they had gone, the kites and vultures that had been waiting patiently around came down and finished the remains of the fish." †

* Pelleschi, *Eight Months on the Gran Chaco*, p. 27.

† *Cruise of the Falcon*, II., p. 102.

THE PARAGUAY MISSIONS.

In the reduction of the Paraguay and Chaco Indians the chief instruments had been the Jesuits, who devoted themselves to this work for two centuries, in the face of tremendous obstacles, which at last became insurmountable. Of these difficulties the most formidable were not hunger, thirst, famine, epidemics, or the savage aborigines, but their own kindred, the white settlers, soldiers, civilians, rival religious and secular missionaries. They aimed at constituting theocratic communities amongst the aborigines, who were regarded by the white adventurers as mere game and legitimate prey, although to be sure, Pope Paul III. had, in 1537, officially declared that the Indians were "real human beings, capable of understanding the Catholic faith and of receiving the sacraments."

Nevertheless, in most of the churches they were denied the communion on the ground of inherent stupidity, ignorance and depravity. The kidnappers organised themselves in bands to capture whole tribes, killing the aged and infirm, and driving the able-bodied men before them at the point of the lance like droves of cattle. Hence the Jesuits who grouped the natives in orderly communities, were regarded as usurpers of the public property, and every effort was made to deprive them of this human live-stock. They were also detested as "aliens," a charge to which their very organisation exposed them, for their country was the Catholic, that is, the "Universal" church. Whatever their accidental nationality, whether Spaniards or Portuguese, French or Italians, Germans or Slavs, they recognised none of the political divisions introduced into the New World; and to them it mattered little whether their Indian congregations were regarded as belonging to the "Most Christian King," or to "His Most Faithful Majesty."

In many local insurrections they had also to suffer from the jealousy of other religious orders, Dominicans, Franciscans, *Mercenarios* or "Brothers of Mercy," and in the towns they were expelled from their churches, while their congregations were reduced to servitude. Then, after succeeding, in the teeth of these persecutions, in founding their theocracy, their neophytes were reported to have brought them great quantities of gold, and a yell of hatred was raised on all sides against them. But the Jesuits had amassed no gold, and although they possessed substantial wealth in their plantations and live-stock, it had no value unless maintained by continuous labour.

After their arrival at Bahia in 1549 their missions were gradually spread southwards to Porto Seguro, to Piratininga and S. Paulo. But the great field of their operations lay farther inland, along both banks of the Upper Parana, about the presumed frontiers of the Spanish and Portuguese domains. In this secluded region they succeeded in civilising over 100,000 natives; but the kidnappers were still on their track, and in the three years, from 1628 to 1631, the Paulistas, themselves nearly all Indians on the mother's side, were reported to have captured 60,000 within the territory of the missions. Then the directors of the Guayra reductions saw that they would have to migrate still to the west, in

order to place more extensive woodlands and more numerous cataracts between themselves and their relentless persecutors. But in the terrible exodus they lost more than half of their devoted adherents by epidemics, disasters, and hardships of all kinds.

Nevertheless, they succeeded in gaining a refuge in the unknown lands on the banks of the Uruguay, and of the Lower Parana, remote from the Spanish and Portuguese settlements. Here, and still farther west on the present Bolivian plains, where dwelt the Mojos and the Chiquitos, the Fathers had at last the joy

Fig. 130.—JESUIT MISSIONS.

Scale 1 : 13,000,000.



of realising on earth that "Kingdom of God amongst Men," for which they had struggled so hard and endured so much.

The term "reductions" given by them to their Indian stations explains the object they had in view. They wished to "reduce" the natives, to withdraw them from the influence of free nature, to regulate their lives by rites and ordinances. To secure their goodwill they shrank from no expedients, not even from the allurements of a generous diet. They were wont to say that the preachings of St. Paul reached the ear of the heathen through the mouth. The natives were beguiled also by music and the pomp of ceremony. When descending the streams

in their canoes, or forcing a path through the forest, the Fathers intoned hymns, while the savages emerged from the recesses to listen to their homilies. During the processions the ground was strewn with bright flowers and sweet-smelling herbs, and birds held by a string fluttered around the triumphal arches. As the Blessed Sacrament was borne aloft, the natives presented the produce of the chase and the fruits of their gardens; musicians accompanied the cortége, and the day concluded with a display of fireworks.

Such appeals to the untutored savage mind were irresistible, and even the most refractory were at last drawn within the fold. Between 1610 and 1768 over 700,000 were baptized, and in 1730 the reductions, some 30 in number, had a collective population of more than 133,000 converts. These statistics were carefully kept, for the missionaries had to pay the king a dollar a head, receiving in return a free hand in their government of the congregations.

Once bent to the yoke, the catechumens strictly followed the prescribed rules. At dawn the children trooped to the church for the exercises of song and prayer, while the whole community assisted at mass. In the evening the children returned for instruction in the catechism, after which all took part in prayer, the day ending with the recitation of the rosary. On Sunday the ceremonies were redoubled, and those of the faithful gifted with a good memory were expected to repeat the sermons by heart. All work was strictly regulated; each family received its plot of land, with the necessary allowance of seed-corn, and oxen to plough the field. But it was at the same time responsible for the good condition of the animals and of the crops, of which it enjoyed only the usufruct.

The part of the territory cultivated in common was the *Tupambac*, "Property of God," the harvest being stored against bad years, and for the support of the feeble, orphans, and artisans. The excess was transported to Buenos Ayres by the rivers, and exchanged for sumptuous objects introduced from Europe for the adornment of the churches. Round the central square were disposed the workshops of the craftsmen—carpenters, masons, locksmiths, weavers, métallurgists, flute and fiddle-makers, sculptors, architects, gilders, carvers, and even painters—who were taught to look on their work as an act of faith, and to make the embellishment of the churches a labour of love. All shortcomings noticed by the overseers, reported by the faithful, revealed in the confessional or by public avowal, involved corporal chastisement. The penitent had to appear in church before the congregation, and submit to the stripes, while thanking God and the good fathers for the correction.

In this "model republic," sustained by a hateful system of espionage pervading all classes, from the highest to the lowest, the rule of the priests was absolute. Yet they hesitated to place arms in the hands of their subjects, even to defend the missions. Nevertheless, they were several times driven by urgent necessity to take action against the Paulistas. Between 1638 and 1661 they gained four victories over the aggressors; but after each triumph they disarmed the people through fear of the influence acquired by the chiefs, whom success had made

popular. When the order was suppressed, the Jesuits made no resistance, and their expulsion was unattended by bloodshed.

The reductions possessing no initiative or any vital force, these emasculated communities melted away as soon as the controlling power was removed. Efforts were made to keep them together in some places by other missionaries, in others by the civil authorities; but all in vain, and in 1801 not more than 14,000 Indians remained in the territories of the missions. Most of the congregations had dispersed among the surrounding forests, while bands of brigands from Uruguay invaded the villages, despoiled the churches, and carried off the cattle. Then white traders and settlers were introduced, and in 1814 about 1,000 strangers from Argentina and Uruguay had merged in a general population with the 8,000 Indians still remaining in the district. Lastly, in 1848, a presidential edict declared the surrounding aborigines of the reductions "citizens of the Republic." At present all traces have disappeared of the organisation established by the Jesuits, and the still existing stations differ in no respects from the other Paraguayan villages.

THE PARAGUAYANS.

The inhabitants of the towns have been strongly Hispanified, and can scarcely be distinguished from other mixed descendants of Spaniards and Guarani natives. They speak both languages, and some of the periodicals contain articles and poems in the *lengua geral*.

From the very first the Basque people seem to have taken a large share in the colonisation of Paraguay. Irala, who was governor of the country both before and after the rule of Alvarez Nuñez, belonged to the Euskarian nationality. Palgrave assigns such a large proportion to the Basque element, that he goes so far as to call the Paraguay people "Vasco-Guarani," instead of "Hispano-Guarani." According to this writer the persons with light hair frequently met in Paraguay are descendants of those light-haired Basques, who are still constantly met in the Western Pyrenees.*

On the other hand, Martin de Moussy believes that the tall and fair-complexioned Hispano-Guarani, who constitute a considerable proportion of the Paraguayan population, recall the type of the German soldiers who entered the country with Schmidel at the time of the Conquest. In support of this view it is stated that the blonde Paraguay women have a Teutonic physiognomy. Their hair is described as really light, like that of the North European women, not of that Spanish flame colour, which approaches a red or ruddy hue, and which is met in all the other Argentine regions.

But, whatever their origin, the Paraguayans are distinguished above all other civilised peoples for their extremely docile disposition. Brutal orders issued by brutal taskmasters are meekly obeyed without a word of protest, and, after sub-

* *Ulysses, or Scenes and Studies in Many Lands.*

mitting to a war of extermination imposed on them by a bloodthirsty tyrant, the survivors maintain a passive attitude while being deprived of their very lands by legal chicanery. The national diet, so different from that of the Argentines, must certainly contribute in some measure to give the Paraguay people such a meek, almost cringing, temperament. Many never touch meat, manioc and oranges constituting their chief food. The wife, who works the field, also controls the household. Hers is the ruling spirit, and when the temporary unions are dissolved, the children always follow the mother. Such unions are for the most

Fig. 131.—OLD JESUIT CHURCH AT PIRAYU.



part deprived of legal or religious sanction, a strange reaction from the severe discipline of the reductions, where the least levity was punished by heavy penalties.

TOPOGRAPHY.

In Paraguay scarcely any centres of population deserve the name of towns, and the right (Paraguayan) side of the Parana is almost uninhabited. Little is seen except a few *ranchos* in the forest glades frequented mainly by the maté gatherers. Such are *Goycocheas*, at the head of the steam navigation, and lower down *Tacuru Pucu*, future terminus of a railway, which is to reach the Parana about 18 miles above the confluence of the Brazilian Iguazu. Then follows *Guayarrros*, formerly

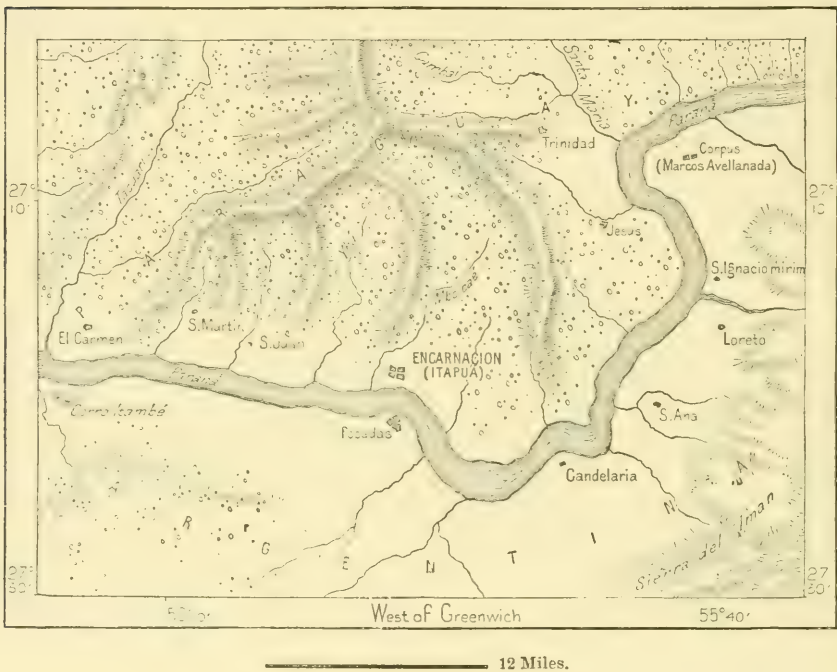
Villa Azara, so named from the naturalist who resided here in 1788 to study the surrounding flora and fauna.

ENCARNACION.

Farther down camping-grounds become more numerous, and here the important village of *Itapua*, better known by the name of *Encarnacion*, given to it by the Jesuits, marks the point where the Parana begins to flow due east and west. For 200 years Encarnacion has commanded the passage of the river between Paraguay and the Argentine province of Corrientes. The Jesuits had made it the headquarters of their southern missions, and later, under the dictatorship of

Fig. 132.—ENCARNACION.

Scale 1 : 700,000.



Francia, it was made an outlet for the foreign trade of Paraguay. Hither the Guarani brought their convoys of mules, their tobacco and maté, in exchange for the coffee, sugar, and European goods imported by the Brazilian traders from Rio Grande. All transactions were carried on by the barter system, the dictator having forbidden the exportation of gold and silver specie.

At present much of the traffic of Encarnacion has been diverted elsewhere by the steamers plying on the Paraguay and Parana rivers. But this place is intended to be the terminus of the proposed railways that are to traverse part of the maté-growing country. On the opposite or Corrientes side stands the Argentine town of Posadas, which is also to be a railway terminus for a line running through Monte Caseros to the Lower Uruguay.

Encarnacion lies beyond the zone where maté flourishes; but the old missions situated a little farther north in the hilly districts watered by several small affluents of the Parana, still possess some extensive *yerbales*, "yerba maté thickets." The native populations, which formerly constituted the congregations of the missionaries, have remained in the country, although in greatly reduced numbers. Here are also the old stations—*Trinidad*, *Jesus*, *San Pedro*, *Santiago*, *Santa Rosa*, *Santa Maria*, *San Ignacio Guazu*—consisting of low huts above which rise the remains of solid structures and heavy churches.

SANTA ROSA—CONCEPCION.

Santa Rosa, wealthiest of these missions, consecrated to the patron saint of the Guarani, was annually visited by thousands of pilgrims, who never approached her shrine empty-handed. Hence the church, which still exists, was extremely rich in gold and silver objects; it was enclosed by a ditch to defend it from marauders. Between *Santa Maria* and *Santa Rosa* the plantation of *Cerrito* recalls the sojourn of Aimé Bonpland, who was here interned for nine years by the dictator, Francia.

Below Encarnacion follow *San Juan*, another old mission, and the villages of *Carmen* and *San Cosme* just above the *Apipe* rapids. Beyond this point the navigation is open all the way to the Paraguay confluence above Corrientes.

Concepcion, below the ruins of *San Salvador* on the Paraguay, was formerly one of the great depôts of the maté trade. Lower down follows the pleasant little town of *San Pedro*, on the Rio Jujuy, a short distance above its junction with the main stream. Farther south *Villa Hayes*, so named in honour of the President of the United States, who in 1879 awarded North Chaco to Paraguay, stands on the right bank at the confluence of the Rio Confuso.

ASUNCION.

Asuncion, capital of the Republic, is finely situated on a terrace rising some 50 feet above the left bank of the Paraguay a short distance below *Villa Hayes*. Like nearly all American towns of Spanish origin, it has been laid out on the chess-board plan, and its dusty streets are continued beyond the houses far into the country. Although steadily recovering from the effects of the war, the thoroughfares removed from the centre are still grass-grown, and the palaces, which were to make Asuncion the most sumptuous city in South America, were till recently falling to ruins. Since their restoration they contribute to give the place a stately aspect, at least by contrast with the towns of Matto Grosso. The arsenal, founded before the war, contains dockyards where several steamers have been built.

As far as this point the Paraguay is accessible to large vessels from Monte Video and Buenos Ayres; but higher up it is navigable only by small craft. Asuncion, which is traversed by several tramways, is little more than a trading station, with no local industries beyond a little goldsmiths' work.

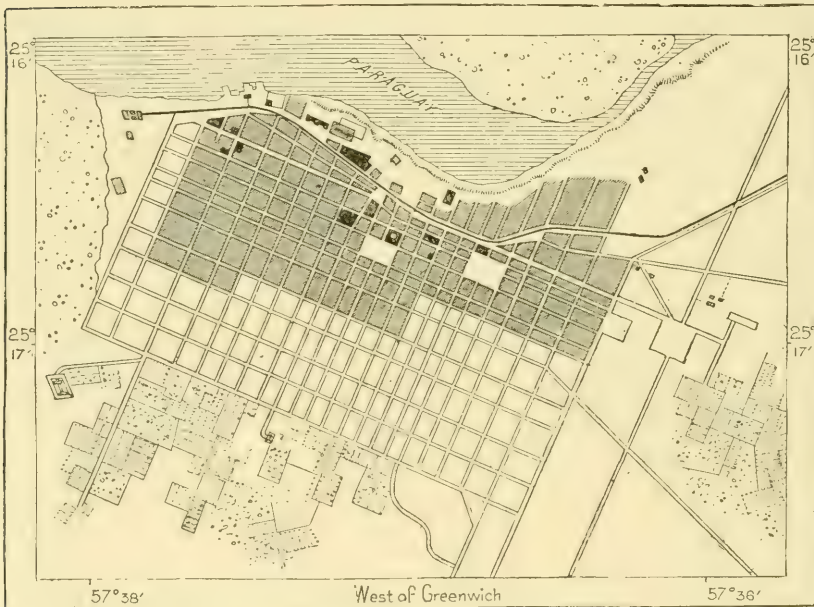
VILLA RICA—SAN BERNARDINO.

Asuncion is connected by the only railway (1894) in Paraguay with *Villa Rica*, originally a Jesuit foundation, which lies on the last slopes of the central cordillera in an extremely fertile district watered by the "great" and "little" Tibicuary. Small steam launches ascend the Tibicuary to Villa Rica, which is destined to become the central point of the future railway system of Paraguay. From the Asuncion line will soon run two branches to the Parana, one through the Monday Valley eastwards in the direction of Tacuru-Pucu, the other southwards to Encarnacion.

The Asuncion railway runs south-eastwards through a succession of orange

Fig. 133.—ASUNCION.

Scale 1 : 45,000.



groves and banana plantations, interspersed with farmsteads and country seats. In this cultivated district one of the stations on the line is the pleasant little town of *Luque*, which was for a short time capital of the State towards the close of the war, when Lopez ordered the evacuation of Asuncion. Farther on, the railway, skirting the west side of the charming Lake Ipacaray, passes along the foot of the Cerro Leon eminence, where Lopez established the headquarters of the Paraguayan army at the beginning of the contest. In this lacustrine valley the chief stations are *Aregua*, *Itagua*, and *Pirayu*, all mere rural hamlets.

Then follows the more important town of *Paraguari*, famed for its tobacco, which is exported even to the European markets. In the vicinity is an imposing bluff pierced with caverns, where the Apostle St. Thomas is fabled to have resided

and preached the gospel to the Guarani nation. The legend is probably of Jesuit origin, for Paraguari was one of the missions founded by the Company of Jesus, which here possessed immense herds of cattle. At present the district, which is studded with numerous villages and farmsteads, occupies itself mainly with tillage; its inhabitants have even developed some local industries, such as the fabrication of oils, sugar-making, and the preparation of starch. The women in

Fig. 134.—ASUNCION—STREET VIEW.



several of the villages are skilful lace-makers; the people of *Ita* manufacture earthenware, which is forwarded to the Buenos Ayres market, and those of *Yaguaron* extract the essence of orange flowers.

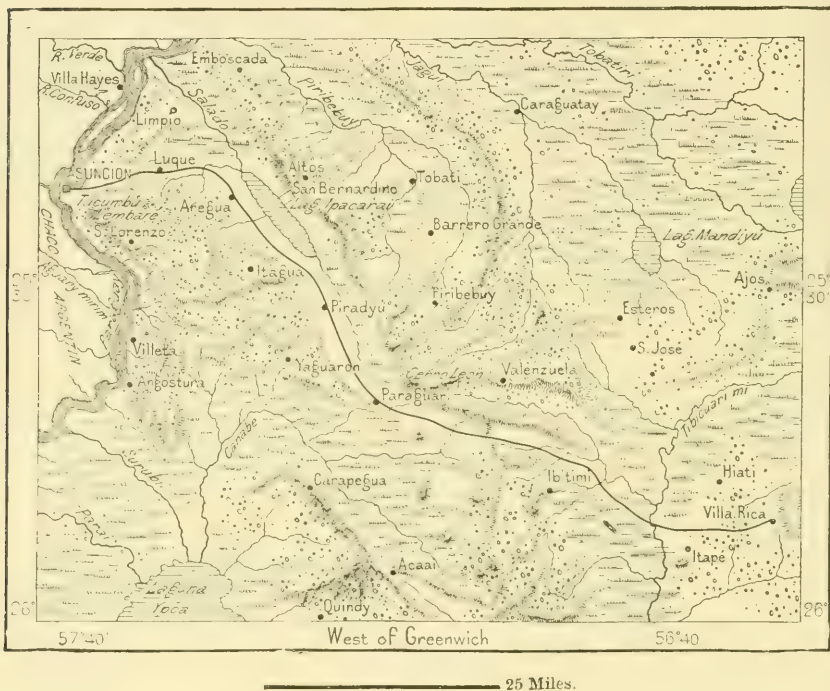
San Bernardino, the most important colony founded by the Government, has been established in the district north of the lake, on the slopes and in the valleys of the Cordillera de Altos. Most of the settlers, who are of German origin, devote themselves to stock-breeding, brewing, and dairy-farming, making cheese, and

forwarding milk and other produce to the nearest railway station for Asuncion. Nevertheless, a large number of the first arrivals at San Bernardino have abandoned their holdings owing chiefly to the lack of easy communications. They have, however, been replaced by others, and the little settlement is gradually growing into a flourishing rural town.

Amongst the immigrants preparing to colonise the unoccupied lands of Paraguay, mention is made of some Australians, to whom the Government has granted a tract 230 square miles in extent on the banks of the Tibicuary. The Association which has received the concession is required to introduce before the

Fig. 155.—FROM ASUNCION TO VILLA RICA.

Scale 1 : 1,250,000.



end of the year 1894 several hundred Australian families, who are to share the yearly produce of the community, and who will enjoy self-government to the extent of electing the directors of the commune by a majority of all adult male and female votes. The reminiscences of the old Paraguay missions would appear to have influenced this scheme of organisation, which so far does not appear to have been attended by much success.

LAMBARÉ—ANGOSTURA—PILAR.

Travellers descending the Paraguay from Asuncion soon lose sight of the city behind the *Lambaré* bluff, which rises about 330 feet above the right bank of the

river, and which is said to take its name from a native chief, who held out stoutly against the Spanish invaders in 1528. According to the tradition, Sebastian Cabot, who was in command, did not venture to advance beyond this point, although he had repulsed the Indians. A few hills, which, like Lambaré, contain deposits of salt, follow along the left bank, enclosing the pleasant little riverside port of *Villeta* with its palm and orange groves.

The heights terminate southwards in a headland, where the stream contracts, at the famous *Angostura* "Narrows," to a breadth of not more than 265 feet.

Fig. 136.—SOUTH-WEST PARAGUAY.

Scale 1 : 2,400,000.



169 Miles.

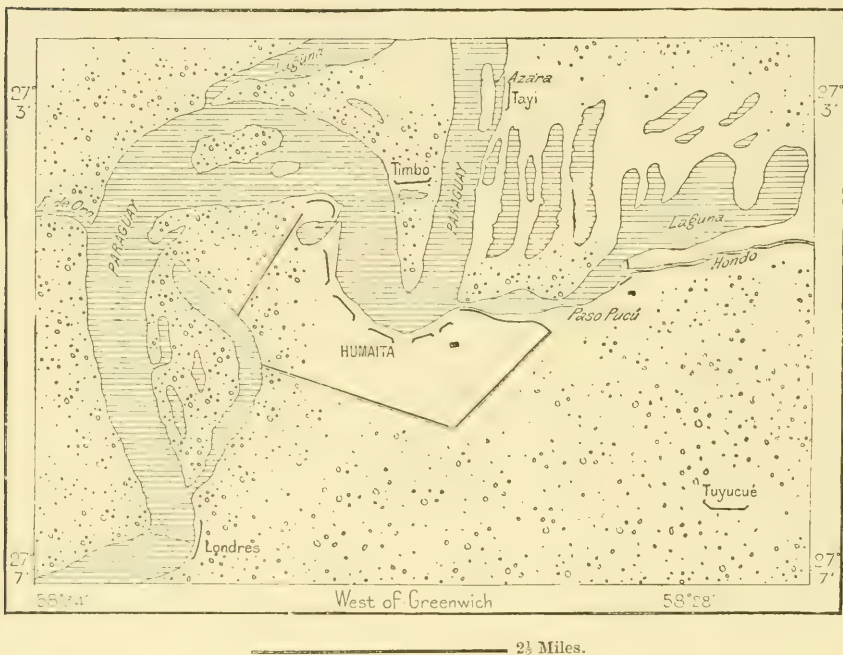
Here also the Indians made a stand against the Spaniards, and three centuries afterwards the Paraguayans attempted to arrest the advances of the allies by the formidable lines erected at the same spot by the English engineer Thompson. But the Brazilian army, at the risk of being overtaken and drowned by a sudden rise of the Paraguay, turned the position by passing westwards through the Chaco solitudes, and reappearing on the banks of the river above the Narrows.

Below this defile almost the only places of note are the villages of *Oliva* and *Villa Franca* on slight rising grounds above the Tibicuary confluence. *Villa del Pilar*, usually called *Nembucu*, might seem to occupy an excellent position

between the Tibicuary and the Bermejo confluences at the converging point of the two great natural highways. But such advantages are of small account in an almost uninhabited swampy region. The Rio Nembucu, which joins the Paraguay at Villa del Pilar, carries off some of the drainage of the marshy tract occupying the south-western corner of the Republic enclosed between the two main streams. It was evidently one of the old beds of the Parana, and whenever the time comes to drain this district a canal will have to be cut in the direction of this natural waterway. During the dictatorship Pilar was for a time thrown open to foreign trade, and numerous settlers from Corrientes have established

Fig. 137.—HUMAITA.

Scale 1 : 120,000.



themselves in this place, which faces the Argentine town of Puerto Bermejo on the right bank of the Paraguay.

HUMAITA—ITAPIRU.

A few crumbling ruins on the cliffs dominating the *Humaita* bend midway between the Bermejo and Parana confluences recall the stand made at this point for two years (1866—68) against the land and river forces of the allies. The whole space between the stronghold and the mouth of the Parana ran with blood, and the capture of *Itapiru* at the confluence cost the Brazilians a sanguinary engagement. Higher up the batteries of *Curuzu* on the left bank long arrested the Brazilian fleet, and the allies attempted in vain to storm the forts of *Curupaiti*, which, when half-dismantled, were afterwards passed by the hostile fleet.



HUMAITA—VIEW TAKEN FROM THE BANKS OF THE PARAGUAY.

In the interior *Tuyuti* and *Tuyucué*, guarding the passes of the great *estero Bellaco* morass, were also the scene of fierce combats, and after the struggle, an invasion of cholera turned the whole region into a vast necropolis.

The fortress of Humaita itself was not actually taken by assault; but the summer floods having risen to an unwonted height, the strong iron cable barring the passage was submerged to a depth of over 16 feet, and four of the seven Brazilian ironclads took advantage of a foggy starless night to gain the upper reaches. The defenders of Humaita, taken between two fires, on the one hand by the warships, on the other by the troops lining a rampart of circumvallation drawn from *Itapiru* on the Parana to *Tuyi* on the Paraguay, a distance of 24 miles, had to evacuate the stronghold and fall back on other lines of defence farther north.

A few military posts, erected on piles or on artificial mounds, formerly guarded the confluence of the Parana and Paraguay; but no town or village was ever founded in this miry district. According to Felix de Azara the Paraguay discharges at low water a volume of not more than 7,000 or 8,000 cubic feet per second.

MATERIAL AND SOCIAL CONDITION OF PARAGUAY.

The first census of Paraguay dates from the end of the eighteenth century, when, according to Azara, the whole population of the province, including the Indians, numbered 97,480. Between that time and the great war profound peace prevailed, even during the political changes caused by the movement of independence, and if a document issued by the dictator, Solano Lopez, can be trusted, the Paraguayans had increased to 1,337,439 in 1867. But the details were never published, and many doubted the possibility of such an increase in the absence of any great access of immigrants. Yet with fewer numbers it is difficult to understand how the nation could have maintained such a stupendous struggle for five years against her three powerful neighbours. From the first an active force of 50,000 men was organised, besides a strong reserve and several thousands engaged in the arsenals constructing floating batteries and steamers, in repairing damages, casting guns, manufacturing small arms, munitions of war, and uniforms, for Paraguay was completely isolated and could import no supplies from abroad.

In 1887, eighteen years after the war, a fresh census was taken, showing a population of only 239,774, according to which over a million, or four-fifths of the whole nation, must have perished in the war. In 1890 the civilised Paraguayans were estimated at 500,000, and the un-reduced Indians of Chaco between the Pilcomayo and the Paraguay, at 30,000. In recent years immigration has contributed to the re-peopling of the land, and the incomplete returns for 1887 comprised nearly 8,000 strangers. Since then the yearly arrivals have been about a thousand, and in 1890 as many as 2,395, mostly from Argentina.

Thanks to the facilities of communication, the Argentine provinces naturally supply the largest number of immigrants. But some Brazilians have also found their way into the country, descending from the uplands by the Iguazu Valley. Amongst the strangers are a few representatives of almost every country in the New World and Europe, more especially Italians. It is noteworthy that, according to some partial returns, civil registrations, and baptismal entries, more females are born than males. This phenomenon, which has been also observed in Japan, is extremely rare in countries where accurate statistics are published. Nevertheless, the fact had already been noted at the end of the eighteenth century by Azara, who even determined the proportion of the sexes: fourteen females to thirteen males. Most other travellers who have visited Paraguay have made analogous observations, and De Bourgade, amongst others, refers to the baptismal registers of Asuncion for 1887 as showing that the percentage was 47·6 for boys and 52·4 for girls. "In the rural districts it appears that the disproportion is larger, and that the entries for girls are 9·28 per cent above those for boys. The disproportion is anomalous; it stands out in contrast with the returns of the Argentine Republic, which show the birth of more boys than girls." *

MATÉ CULTURE.

Industries of all kinds, including even agriculture, are still in a rudimentary state, and at present the most profitable occupation is the collection of forest products, such as lumber in Chaco, and yerba maté in the eastern woodlands. Paraguay is usually supposed to have a monopoly of maté (*ilex paraguariensis*), although it also thrives in the Southern States of Brazil, where it even supports a considerable export trade. But that of Matto Grosso passes through Paraguay, and is sold in the markets as Paraguayan in order to enhance its value.

It was in the territory of the missions that the Jesuits became acquainted with the use of this beverage, the taste for which, thanks to their reports, was introduced into the southern part of the Continent. The *caa* of the Guarani, that is, the "plant" in a pre-eminent sense, has been translated by the Spanish *yerba*, "herb," though it is not a herb, but a shrub, and even a tree, about the size of the orange, but on the banks of the Ygatimi, a Parana affluent, growing to a height of 25 or 26 feet with a girth of about 40 inches. Bonpland speaks of three varieties in Paraguay, differing little from each other, and resembling the *congouhas* of the Brazilian plateaux. Its range comprises the whole space stretching from the south of Minas Geraes to the frontiers of Rio Grande do Sul, and from the Atlantic to the Paraguay river. It is also said to have been met beyond Chaco in the southern parts of Argentina, but the best quality is that of Paraguay, and especially that collected in the forests of the Rio Maracaju. Under the Jesuits each mission had its cultivated *yerbal* yielding the *caa mini*, superior in flavour to the

* *Paraguay*, p. 107.

caa nana. But there are no longer any plantations, but only thickets of the wild plant, which is often recklessly cut down in order the more easily to gather the leaves. The *yerbateros*, who have to make long journeys to these grounds, first dry the foliage and tender branchlets over a slow fire, and then reduce them to a powder when they are ready for the market. The decoction appears to act both as a stimulant and as a substitute for food, by retarding the progress of digestion. About half the yearly crop is required for the local consumption, the rest being exported.

It is even claimed for maté that it stimulates the physical and mental powers, without any waste to the system. And herein, remarks De Bourgade, lies the secret of the preference shown by Americans for this beverage. It is not from any scientific theories, but from practical experience, that they have been convinced

Fig. 138.—YERBA MATÉ REGIONS OF PARAGUAY AND BRAZIL.

Scale 1: 14,000 000



of its immense superiority over tea and coffee. Coca also is just as available to them as the *ilex*; but while the latter has become as indispensable as manioc itself, coca has been rejected, and is now consumed only by a few Indian tribes and some residents in the mountain districts.

Such a practical verdict in its favour proclaims its excellency; it is a popular, as distinguished from a scientific, tribute to its virtues, and may well provoke the inquiry why the Old World has remained indifferent, continuing to import tea from China and India, and coffee from Arabia and the Colonies, but neglecting the yerba maté of South America? Yet the supply is adequate to all possible demands; subject, however, at present, it must be owned, to the disadvantage that the yerba is under no well-organised system of cultivation.*

* Paraguay, p. 21.

THE ORANGE AND OTHER AGRICULTURAL RESOURCES.

Next in importance to maté is the *apepu*, or native orange, which De Bourgade believes to be indigenous, and which is distinguished by a peculiar acid taste. Like maté it grows wild in the forests, while the different varieties of the European orange introduced by the settlers also thrive well. Every village, almost every house, has its orange grove, and during the floods millions of the golden fruit are sometimes swept down with the stream. The oranges, exported almost exclusively from the riverside ports of Asuncion and Villeta, represent but a fraction of the annual yield, most of which perishes through lack of communications to develop the industry.

Nevertheless the official returns show that over 50 million oranges annually pass through the chief ports of Paraguay, and this would be nearly doubled if those were included which are disposed of from the small villages and estancias, where no control is exercised by the custom house officers. To reckon up the number of oranges that are consumed in the country, so as to include those that rot on the trees or that are devoured by birds, monkeys, and other animals, would be about as difficult as to count the grains of sand on the sea-shore. Hardly a Paraguayan could be found who does not consume from 20 to 30 oranges a day, and yet there is no sign of diminution of the golden crop. What it would be if cultivated systematically only imagination can conceive. But it is by no means to the fruit that the produce of the orange must be limited. Every part of the tree has its special use; the blossom can be distilled, essential oil may be extracted from the leaf, and the trunk is not to be despised as wood.

The bitter orange, also, is by no means an unprofitable fruit. It is not edible, but it yields several useful products. Besides the oxalic and citric acids, and their compounds, which are extracted from its pulp, the peel furnishes several medicinal syrups, and it is also a main ingredient in Curaçao. The peel delivered at the port of Asuncion fetches twenty-five shillings per 100 lbs., and a brisk trade has already been developed. If, instead of sending the bitter orange-peel to distant markets, it should be desired to utilise it on the spot, there would be required only a very simple apparatus to produce the compound known to druggists as the "Essence of Portugal," which uniformly commands a high price. This has not yet been made anywhere in Paraguay.*

Not more than 165,000 acres, or about the four-hundredth part of the whole territory, has been brought under cultivation. The women, who do nearly all the field-work, chiefly occupy themselves with maize, the consumption of manioc diminishing according as the supply of bread stuffs increases. Wheat and rice are also grown, but in insufficient quantities for the local demand. Although the vine is seen trailing round the verandahs, there are no vineyards properly so-called. Every peasant has his little sugar-cane brake, but utilises it only for the preparation of a coarse unrefined sugar, or a very impure kind of rum. Both coffee and ground-

* *Paraguay*, p. 227.



CONVOY OF WAGGONS.

nuts give good results, but capitalists have hitherto chiefly favoured tobacco, which is generally regarded of analogous flavour, but superior in quality, to that of Havana. Perhaps nowhere else are cigars so universally consumed, the proportion being about 24 lbs. per head of the population, or twelve times more than in France. Possibly this enormous use of tobacco may partly explain the infinite patience or apathy of the Guarani under all trials.

A decisive proof of the excellence of the Paraguay leaf is afforded by the esteem in which it is held by the Argentine people, probably, next to the Paraguayans themselves, the greatest smokers in the world. But hitherto no justice has been done to the fine qualities of this tobacco by the growers and cigar-manufacturers at Asuncion. Everything in the way of preparation, which ought to be done with the most scrupulous care, such as the gathering and the drying of the leaves, is got through in the most primitive and careless manner. Great improvements must be introduced into these processes before there can be any question of introducing the Paraguay tobacco into the European markets. De Bourgade states positively that the quality of the natural leaf grown on the red soil in many districts of Paraguay "equals that of the finest Havana growths."

Of the live-stock, estimated at 2,000,000 before the war, no more than 15,000 head of cattle survived the universal waste of the land. The loss is now being made good by importations from Corrientes and Matto Grosso; but the animals run half-wild, and except in the German colony of *San Bernardino*, near Asuncion, no use is made of the milk, either directly or in the preparation of butter or cheese. A few horses are also bred, but scarcely any sheep, goats, or pigs. Sheep farming is said to be impossible owing to the presence of a poisonous plant called *mio-mio*, while the *mal de cadeira*, an infectious disease, rapidly kills off horses, mules, and asses in the Paraguayan part of Gran Chaco.

LAND TENURE.

Under the Jesuit system the land was held to belong to all, while its products were partly distributed to the community. Later, the dictators, as representatives of the State, became the true owners of the soil, although each peasant had his cabin and holding. After the war, nearly the whole territory having been depopulated, the land again reverted to the State, which put it up to sale at so much the square league, according to its quality and proximity to the markets. Argentine, English, and North American speculators immediately rushed in, and hundreds of thousands of acres were bought up by syndicates to be re-sold at ten and twenty times their value. One capitalist alone acquired some thousand square miles, and in these transactions no regard was paid to little holdings that had been cultivated for generations by Guarani families, which had never needed any title deeds to protect their rights. In a few years the vast solitudes were assigned to absentee proprietors, and henceforth no Paraguayan peasant could hoe

a yard of his native land without paying a rent to New York, London, or Amsterdam bankers.

INDUSTRIES—COMMUNICATIONS.

Although there are no local industries beyond a few distilleries, brick and soap works and flour mills, the Guarani are excellent craftsmen, and under the Jesuits displayed great skill in many trades. The women still weave all kinds of textiles, amongst others the *ñanduti*, "spiders' webs," of extremely delicate texture.

Before Argentina had begun its railway system, Paraguay already possessed a line running from Asuncion to Paraguari, since extended to Villa Rica, and the country was also traversed by roads accessible to wheeled traffic. One of these roads skirted the left bank of the Paraguay; another reached the Parana at Encarnacion, while others radiated from Villa Rica. After the war all these roads disappeared beneath the swamps and quagmires; but they have since been repaired and other tracks have been opened between the *Yerbales* and the riverside ports. Small steamers ply on some of the affluents, while large vessels ascend the Parana from Buenos Ayres to Encarnacion. The traffic is still more active on the Paraguay, nearly the whole trade of the Republic being centred in Asuncion.

The telegraphic and postal services have been greatly developed, especially since Paraguay has joined the Postal Union. The schools have also been re-opened, and in 1891 nearly 20,000 children were receiving an elementary education. The country is thus gradually recovering from the drastic "reforms" which closed the churches, suppressed the marriage rites and legal unions, and swept away all public institutions. Before the period of independence education was entirely controlled by the priests, and in those days most of the children, if unable to read, could at least say their prayers. They also delighted in singing the church hymns, for the Guarani people have a distinct talent for music. But most of the ecclesiastics having been deposed or banished by the dictator Francia, the system of public instruction was greatly modified, and transformed to an almost military education. In all the villages the children were assembled by the beat of the drum, and under pain of reprimand or punishment the local magistrate was bound to see that all the boys followed the prescribed course of instruction. Thus, before the outbreak of the war, nearly all Paraguayans had learned to read and write. But it was all done under compulsion, for they took no pleasure, as a rule, in these accomplishments.

Printing presses were also rare, although some had already been introduced by the Jesuits. But after their time no printing office was opened till the year 1844. The head of the Administration issued his orders verbally, well knowing that they would be implicitly obeyed. Later, when the official journal began to appear, the representatives of authority assembled the inhabitants of all the villages, and solemnly read out the decrees of the Government, which were listened to with religious silence.

GOVERNMENT.

The present Constitution, dating from the close of the war, has been modelled on that of the neighbouring States, and like them, Paraguay possesses the legislative, executive, and judiciary powers. The communal group consists of the *partidos*, administrative and judiciary units connected directly with the central power by elected magistrates. Foreigners have the right to vote at the municipal elections, and are even themselves eligible. A *jefe político* represents the executive in each commune, to which the Minister of Justice appoints a stipendiary magistrate.

Two Chambers, directly elected by universal suffrage, discuss all questions except the Budget, which is reserved absolutely to the lower House. The President, elected like the deputies for four years, controls the executive, and chooses five ministers responsible to the Chambers. Catholicism remains as formerly the State religion, but liberty of worship is recognised. The free navigation of the rivers, one of the main causes of the war, was a necessary result of the triumph of the allies. Henceforth the Paraguay and the Parana are open to the vessels of Brazil and the Argentine Republic. Foreigners also are allowed free access to the State from all points of the frontier, without being furnished with passports, a necessary condition under the old exclusive system.

The country has not recovered its financial equilibrium upset by the war, and the annual Budget continues to show a heavy deficit, nearly £105,000 in 1891. In 1892 the external debt, including the consolidated English debt, stood at about £5,000,000, and in that year the Government failed to pay the interest on the English debt, which amounted to over £830,000. But the financial position is likely to improve with the development of trade, about five-sixths of the revenue being derived from the Customs.

It may be mentioned that after the war, when the State was hopelessly bankrupt, without resources or credit, England was the only country that could be induced to come to the aid of Paraguay. The London capitalists twice made advances amounting collectively to a sum of £1,438,500; but through one of those financial mysteries, of which the history of the Hispano-American Republics offers so many examples, not even a seventh part of the loan, £200,000 at most, found its way to the State treasury. Negotiations were opened with a view to diminish this enormous capital, and the bankers consented to a heavy reduction, in exchange for a tract of "five hundred square leagues," or about 750,000 acres. Later the Paraguay Government sold, always to English speculators, the Asuncion-Villa Rica Railway. By this arrangement, followed by a development of colonisation and a corresponding increase in the value of the soil, it was found possible to negotiate the sale of vast tracts of arable land, greatly to the benefit of the public finances.

Commenting on these transactions, De Bourgade remarks that "no European stock-market to the same degree as London has appreciated the vast resources and future development of the States of America. There may be some initial

difficulty to overcome, or some crisis to survive; but England has ever been regardless of a risk that is temporary, and prepared to await a recompense that may tarry, but appears to be sure. Almost all the smaller American States are in her debt; almost all, at some time or other, have failed to meet their obligations; but there is not one of them that has not paid large interest to its patient creditor. No other European market has so accurate an appreciation of the capabilities of America, and it is this which gives England so powerful a hold in the New World, where she disposes of large consignments of her products.”*

Paraguay comprises 23 electoral districts, of which three for the capital, nominating four deputies and three senators; the rural districts elect 32 deputies and 16 senators, while Chaco forms a special division.

* *Paraguay*, p. 83.





CHAPTER XVI.

URUGUAY.

URUGUAY, smallest of the South American Republics, often takes the name of "Banda Oriental," which indicates its former state of political dependence on Argentina. Of itself the expression has no meaning except as used by the people of the "Banda Occidentale," that is to say, the inhabitants of Buenos Ayres and the Argentine "Mesopotamia." Under the colonial rule this territory formed part of the Spanish possessions, and even after the separation it continued to constitute a province of the Argentine Confederation till the year 1815.

But the Portuguese and their Brazilian heirs also regarded this peninsular region, bounded by the ocean, the Plate estuary and the Rio Uruguay, as the natural complement to their vast domain. Hence the post of Colonia, facing Buenos Ayres, was hotly contested by them at the end of the seventeenth and during the following century, and it was to outflank the Portuguese that the Spaniards founded in 1724 the town of Monte Video, which has since become the capital of Uruguay.

But in 1821 the Brazilians, taking advantage of the internal dissensions of the Platian Republic, succeeded in annexing Uruguay, constituting it the Cisplatine province, and for six years they remained masters of the whole seaboard between the Amazons and Plate estuaries. Then for another period of three years Uruguay formed part of the Argentine Confederation, after which followed the "great war," which lasted sixteen years, from 1836 to 1852, and which left the country a vast solitude.

During the war with Paraguay the little Republic retained only a nominal autonomy, for it had to accept the President imposed upon the country by the Brazilians. Even now its independence is entirely due to the rivalry of its two powerful neighbours. Yet, despite its unstable political position, it has made considerable progress since the great war. During the nineteenth century the population has increased more than tenfold, and trade has even made still more

rapid progress, for few countries enjoy a more favourable commercial position, combined with all the advantages of a good climate and fertile soil.

Bounded north by the little Rio Chuy, the Lagoa Mirim and the Rios Jaguarão and Quaram, and elsewhere by the Uruguay river, the Plate estuary, and the Atlantic, Uruguay comprises a total area of over 72,000 square miles, with a population (1893) of 750,000.

PHYSICAL FEATURES.

The heights traversing Uruguay, which nowhere exceed 2,000 feet, belong to the same mountainous system as those of Rio Grande do Sul. The ridges take the same name of *cuchillas*, or "knives," although presenting no sharp crests, but only long, gently sloping summits. Most of the surface is broken by these undulations, which are decomposed into hundreds of distinct masses between the intervening rivers and rivulets. Campos and irregular plains stretch along the foot of these hills, which seem high only by contrast, and whose bare upper slopes rise above the zone of vegetation.

Some of the ridges acquire a great development between the river basins. Such are the Cuchilla de Haedo, stretching south-westwards in the direction of Paysandu, and the Cuchilla Grande, which is disposed north and south, gradually diminishing in height, and projecting a few rocky headlands seawards. Between Monte Video and Maldonado the last spur takes the name of Sierra de las Animas.

In the north the prevailing rocks are granites and gneiss, with erupted matter spread over the other formations. Here occur the auriferous deposits, lead, copper, agates, and amethysts. All the gravels known as *pedra china*, "China stone," on the banks of the Uruguay, are organic substances transformed to silica, often containing drops of water, and sometimes preserving their primitive colour. Here are also found the so-called *cocos de mina*, hollow nodules, or clusters, of crystals, which sometimes explode; then the natives say that these "mineral coconuts" have arrived at maturity. The surface of the plains consists of argillaceous beds, which change to mire in rainy weather, and which abound in the remains of megatheriums and other extinct animals.

RIVERS.

The Uruguay, which gives its name to the Republic, is already a copious stream at Salto, where it develops a cascade which arrests the steam navigation except during heavy floods.

"Of course the aspect of the falls must vary considerably with the volume of water in this singularly capricious river, but I am inclined to think that the title of Grand Leap (*Salto Grande*) given them is a piece of Castilian grandiloquence, and that they are never much more than rapids on a very great scale, though as such none the less obstructive to navigation. A wilderness of shallow,

troubled waters was the general impression at once conveyed. The mighty river, vexed and hindered in its progress by a long succession of step-like reefs, had spread itself out over an immense area, breaking its way in lines of foam through the narrow channels worn by its action, and eddying in the deeper places with a force that made the water appear to be seething upwards from concealed cauldrons. The great slabs of dark, slimy rock which remained uncovered in the midst, or were simply trickled over by the surging flood, literally swarmed with water-fowl, drawn to the spot by the fish that lay temptingly in view in the shoal water all round. The entire long-billed tribe—cranes, and herons, and storks of every variety—stood there in serried files, watching their chance with a terrible earnestness, undistracted by the myriads of restless gulls which circled above them, uttering their plaintive, wearisome cry.”*

Even lower down the current is obstructed by the so-called *Corralitos*, “little corals,” reefs dangerous to large vessels, and during low water there is a depth of only 10 feet at the Hervidero. Farther south the river preserves the picturesque aspect of its high banks, its wooded hills, abrupt windings, and shifting scenery. Below Paysandu, where it is only 700 yards wide, it begins to assume the aspect of a broad estuary, with low marshy banks on the west (Argentine) side, terraced cliffs and hills of divers forms on the east side.

It is evident from these contrasts that at some former epoch the Uruguay flowed through the level plain to its junction with the Parana; then at a later period it gradually shifted its bed in the direction of the east, ceaselessly eating away the scarps of the cliffs, and distributing the débris along its right bank. Thus the Uruguay is another illustration of the phenomenon of normal erosion, which in accordance with the “law of Baer,” causes the rivers of the southern hemisphere to encroach on their left bank, whereas in the northern hemisphere the tendency is to gain on their right bank.

The basin of the Rio Negro, by far the largest of the Uruguay affluents, comprises about half of the territory of the Republic. It takes its name, not from the colour of its water, but from the sharpness with which its clear, limpid stream reflects every flitting shadow. After receiving the Tacuarembó and the Yi, the Rio Negro flows normally north-east and south-west; but before reaching the main stream it suddenly turns south, thus enclosing with the Uruguay the long peninsular tract known as the Rincon de las Gallinas, “Poultry Yard.” This natural enclosure served from the early days of the colonisation as a convenient place for herding cattle.

Below the Rio Negro confluence the Uruguay expands to the proportions of a broad lake with scarcely perceptible current, and even at Higueritas, its narrowest point, maintaining a width of considerably over a mile. Above the island of Martín García the Parana mingles its waters with those of the Uruguay at the head of the Rio de la Plata estuary. Sooner or later this estuary must be filled in by the sediment deposited on its bed by the converging streams, and then the

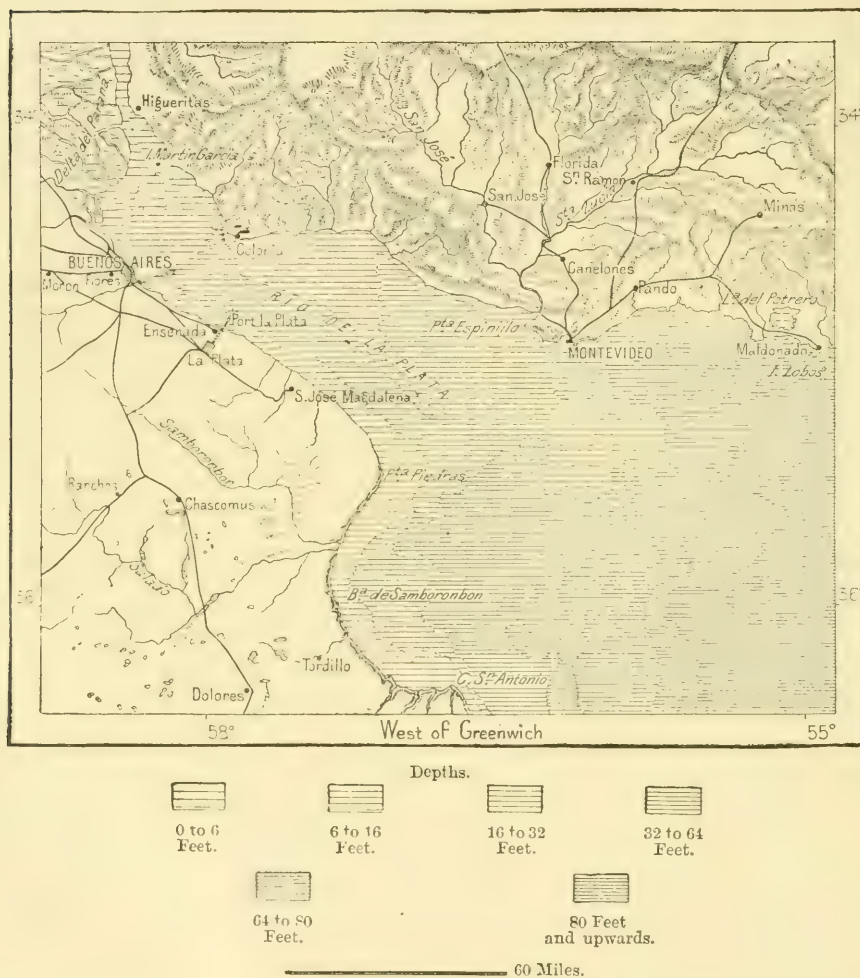
* Rumbold, *The Great Silver River*, p. 238.

Uruguay will be transformed to an affluent of the Parana. Meanwhile it maintains a semi-independent existence, and in former geological times it was an entirely distinct watercourse.

Besides the Uruguay the Republic has no running waters except a few small coast streams, and those rivers which discharge into the Lagoa Mirim and the S. Gonçalo, and which consequently belong to the basin of the Brazilian Rio Grande.

Fig. 139.—LA PLATA ESTUARY.

Scale 1 : 3,500,000.



All these rivers—Cebollati, Tacuari, and Yaguaron (Jaguarão)—have their lower course fringed by marshes into which they overflow during the wet season.

CLIMATE.

Being almost surrounded by water, Uruguay enjoys a marine climate, at least compared with that of the pampas regions. Nevertheless there is still a great

range of temperature, which at Monte Video oscillates as much as 72° or 73° Fahr. This city, lying under a latitude corresponding in the southern to that of Algiers in the northern hemisphere, presents the normal alternation of the four seasons, although winter is so mild that practically the inhabitants distinguish only between the warm period, from October to April, and the cool period for the rest of the year. Owing to exceptional radiation in a clear sky the glass falls now and then below freezing point; but as a rule July, the coldest month, corresponds to April in Paris.

In the interior the summer heats seem at times almost unbearable, but this is due to the conflagrations in the bush country, spreading a mantle of dense smoke far and wide. The most unpleasant feature of the climate is the great difference between the cold mornings and the warm mid-day heats, a difference which usually does not exceed 10° Fahr., but which sometimes rises to 28° and even 32° in a space of eight hours. Such discrepancies, which are very trying to strangers, occur especially in spring (September and October), when the biting winds most prevail.

In the Uruguay valley the atmospheric currents usually set in the direction of the river, either north and south or south and north. But on the seaboard the normal south-east trades blow steadily throughout the summer season. They prevail also in the cool season, but are then frequently interrupted either by northern breezes or by the *pampero*, which comes from the south-west. Although the most dangerous, this *pampero* is also the great purifier, sweeping all vapours, fogs, and particles of dust from the atmosphere, drying the saturated ground, and by the accompanying slight frosts destroying myriads of insects injurious to the vegetation.

But there is also a wet, or "dirty" *pampero* (*pampero sucio*), which is often accompanied by tremendous downpours, especially when it blows from the north in the summer season. "The sheets of water that come down perfectly straight all through the day and night without a break, are accompanied by equally continuous thunder and lightning, which seem to work their way right round the heavens, and to box the entire compass. The thunder is one unceasing muffled roll, out of which burst sudden fierce claps of deafening violence; the lightning playing meanwhile almost uninterruptedly at every point of the horizon, and leaping forth now and then into a great scorching flame, which for a moment lights up the whole world with a lurid blue and yellow. The darkness, too, is very striking, and almost equals that of a dense London fog; while the heat seems to increase rather than to yield to the storm, and one sits as in a prolonged vapour-bath, with the most trying sense of physical prostration and depression of spirits. These storms, in fact, do not in the least clear the atmosphere, and relief only comes when the wind veers round to the south-east, and brings with it a renewed feeling of vigour and elasticity, as marked as were the languor and dejection before."*

There is no well-marked rainy season, and the precipitation is very unequally

* Sir Horace Rumbold, *The Great Silver River*, p. 130.

distributed from year to year. But the yearly average exceeds 40 inches, although rainy days are far fewer than in West Europe. On the seaboard the rains are attended by fierce gales and occasionally change to hail.*

FLORA AND FAUNA.

Uruguay can no longer boast of the rich flora which still survives in South Brazil, at least as far as the Jacuhy valley. Wild palms, especially the yatai (*cocos yatai*), may still be seen on the banks and islands of the Uruguay in association with the taquara, or Brazilian bamboo, but they no longer range farther south than the Rincon de las Gallinas. Woodlands have become rare in the interior; nor do they now present that marvellous variety of forms which is observed in the Brazilian *selvas* and *mattas*. Even the araucaria of the Campos has disappeared, and southwards stretch open, treeless plains, with here and there a solitary ombu, the characteristic tree of the Platean pampas.

In its fauna also, Uruguay belongs rather to the Argentine than to the Brazilian zone. The howling monkey, still heard in the northern forests, has disappeared from the lower reaches of the Uruguay, as the Cayman has from the estuaries. But the rattle-snake is still met in the rocky glens of Minas and Maldonado. The ostrich, seldom seen in the wild state, has been domesticated since 1874, and is now bred in numerous farms. The Platean waters abound in fish to such an extent that during the nine years' blockade of Monte Video from 1843 to 1851 the inhabitants drew their chief supply of food from this source. In the Maldonado district there is a land crab analogous to the *Cancer ruricola* of Jamaica, which is of burrowing habits; it digs itself holes in the dry sand far from the sea-shore and the banks of the lagoons.

INHABITANTS.

At the time of the discovery, Uruguay was roamed by numerous Indian tribes, whom the Spaniards began forthwith to reduce and enslave. They were successful with certain groups, probably of Guarani stock, who occupied the left bank of the Uruguay and its islands. The Yaros, Bobans and Chanas, who submitted to the invaders, soon disappeared, either by absorption, or in the struggle with the Charruas, who had maintained their independence.

These were physically a magnificent race, taller than the Europeans, stout, vigorous and agile, of sober habits, noted for their sharp sense of hearing, always grave and collected, "never complaining even when being killed." They were also a valiant people, whom the Spaniards had to conquer inch by inch. At first they fought with club and arrow, but after the introduction of the horse, they

* Meteorological conditions of Monte Video:—

Latitude.	Temperature.			Rainy Days.	Rainfall.
	Max.	Mean.	Min.		
34° 54' S.	106° Fahr.	62° Fahr.	32° Fahr.	36	40 inches.

learnt the use of spear and lasso, like their Pampas neighbours. Towards the middle of the eighteenth century the Charruas had been driven north of the Rio Negro, where they were joined by the Minuans from the Parana. "The Charruas," wrote Azara, "muster only 400 warriors, but they have cost the Spaniards more blood than the numerous armies of the Inca and of Montezuma." They were finally reduced in 1831, when some were sold to an itinerant showman, the last of these dying in a Paris hospital; but there is no doubt a strain of Charrua blood in the veins of the present mixed Uruguayans, who are physically amongst the finest of the Hispano-American populations.

TOPOGRAPHY.

The right bank of the Uruguay is thinly peopled above the town of *Salto*, which takes its name from the neighbouring "Falls." Salto, third city of the Republic in population, though dating only from the year 1817, is picturesquely situated on the slopes of several hills at the point where the steam navigation is arrested, except when the river is in flood. It practically forms a single city with Concordia on the opposite (Argentine) side. Southwards opens the valley of the River Dayman, which is named from one of the numerous English proprietors whose plantations line its banks.

PAYSANDU—FRAY BENTOS—RIVERA.

Paysandu, founded in 1772 by the "père" Sandu, occupies a position analogous to that of Salto, on a high cliff at the issue of a river valley nearly opposite Colon on the Argentine side. It ranks next to Monte Video in population, and since its destruction by a Brazilian fleet in 1864, has taken a large share in the preserved meat business, whose chief centre is at *Fray Bentos*, officially called *Independencia*, some distance lower down. In 1863, this place was merely a chapel surrounded by a few huts, when the district was chosen by a far-seeing speculator as a suitable site for the establishment of a factory for the preparation of "Liebig's Extract." The factory, itself a small town, gives employment to about 2,000 hands, and during the busy season, the cattle from the Upper Uruguay, the Parana, the Guauguaychu, and the Rio Negro are here "treated" at the rate of about 1,000 a day. Thanks to this industry, Fray Bentos has become the third, and in some years the second port of the Republic. "The nature of the operations carried on here is clearly enough revealed by the whiffs that come borne to us on the night breeze. Once more, to borrow the vigorous and terrible words used by Vicuña Mackenna in speaking of it under the rule of Rosas, this country is literally a huge slaughter-shed, making the air hot and heavy with the smell of blood, and men callously unconcerned at its sight. A profitable trade and occupation for a nation doubtless, but one that keeps alive in it those inborn human instincts of cruelty and savagery, which in our older civilisation have long been curbed and softened down. One of the ugliest traits of the uneducated native of

these countries is his perfect indifference to the sufferings of the brute creation; his comparative disregard of human life is, with such a training, not unintelligible."*

Rivera, at the source of the Cuñapiru, one of the chief affluents of the Rio Negro, forms almost a single town with the neighbouring Santa Anna de Livramento on the Brazilian side. For a time Rivera was a great centre of the gold industry, and considerable quantities appear to have been collected in the Cuñapiru and surrounding valleys. Yet a French company had to cease operations after losing millions of money in this "Eldorado."

DURAZNO—COLONIA—SAN JOSÉ.

Durazno, on the River Yi, midway between *Tacuarembó* (formerly *San Fructuoso*) and Monte Video, has been transformed from a military colony to an agricultural market. Some Indians, expelled by the Brazilian settlers in the territory of the missions, were settled at Durazno in 1828, but instead of allowing them to cultivate their land in peace, the authorities enrolled them as soldiers, and all perished in the civil wars. *Soriano*, near the head of the Uruguay estuary, dates from the year 1624, and here is still seen the chapel built by Bernardo de Guzman for the Chana Indians, who had appealed to the Spaniards for protection against the Charruas. No trace remains of another station which was founded by Sebastian Cabot, a few miles farther down, near the present village of *San Salvador*.

Farther down follow *Higueritas* (*Nueva Palmira*) and *Carmelo* (*Las Vacas*) at a point on the estuary where it narrows from six miles to little over one mile, forming an excellent harbour about the Parana confluence. At the extremity of a headland below the island of Martin Garcia, stands the famous station of *Colonia del Sacramento*, opposite Buenos Ayres. Soon after its foundation in 1679, Colonia, which has the best anchorage in the Plate estuary below Higueritas, was seized by the Portuguese Manoel Lobo, and by him for a time transformed to a nest of smugglers. On the banks of the neighbouring little Rio Martin Chico, the illustrious navigator Solis was killed by the Charruas.

San José, on the river of like name, north-west of Monte Video, was founded at the end of the eighteenth century by some settlers from the north of Spain. During the war with Brazil (1825), the Republicans had made it their capital, and since then it has shared in all the local troubles. Nevertheless, it has steadily prospered, like the neighbouring *Florida* on the Arroyo Pintado, which is spanned by a fine viaduct on the northern railway. The village of *Ituzaingo* on the Rio Santa Lucia in the same district, recalls the decisive victory of the Argentines over the Brazilians in 1827.

MONTE VIDEO.

Monte Video, capital of Uruguay, dates only from the early part of the eighteenth century, when Zabala, Governor of Buenos Ayres, founded it as a

* Rumbold, p. 153.

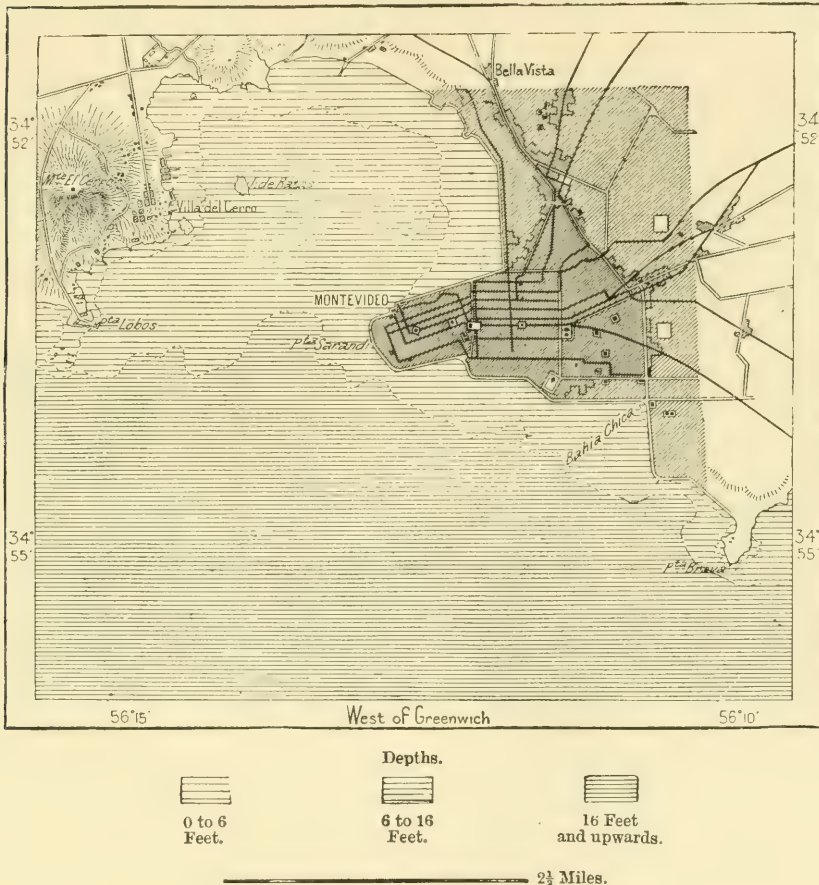


MONTE VIDEO—GENERAL VIEW TAKEN FROM THE CERRO.

military post to cut out the Portuguese, who were threatening to seize the east bank of the estuary. The first colonists arrived from Galicia and the Canaries in 1726, and grouped themselves round the little fort. Then the abolition of the commercial monopoly of Cadiz, in 1778, followed by the opening of the port of Monte Video to free trade, at once attracted numerous settlers, and at the end of the century the new seaport already took the first place amongst the maritime cities of South America. At that time its exchanges were valued at £1,400,000.

Fig. 140.—MONTEVIDEO

Scale 1 : 100,000.



Then followed the turbulent days of the Revolution and Independence, in which Monte Video suffered more than any other place in Plate regions. For nine years (1842-51), the *Colorados* or “Reds,” with Garibaldi’s Italians and the French Basques, valiantly defended this “New Troy,” against Rosas’ lieutenant, Oribe. After the disaster of Monte Caseros, the Plateans were compelled to raise the siege and proclaim the free navigation of the rivers, for which the capital of Uruguay was contending against Buenos Ayres.

Since this triumph Monte Video has continued to expand, and is now believed

to rank for population as the fourth city of South America. It is well situated on an elevated headland which projects westwards, while to the north the shoreline develops a semi-circular curve round to the Cerro, or "Eminence" in a pre-eminent sense, which rises 486 feet opposite the capital at the entrance to the harbour. Rising in amphitheatrical form on the slopes of the peninsula, Monte Video presents a pleasant seaward aspect, while its terraced houses command a wide prospect of the harbour, semi-circular bay, and distant roadstead. The lower parts, till recently encumbered by the remains of the Spanish fortifications, are now occupied by several fine buildings, such as the exchange, banks, and theatres. Amongst the learned institutions a foremost place is taken by the University, which is well attended, especially by students of law, future politicians and legislators of the Republic.

"A walk through the streets and squares of the capital of Uruguay soon showed us how very different were these people that we were now among from the Brazilians in every respect. No two cities could be less alike than these two capitals of neighbouring States. Not here the lofty houses of Rio, but clean streets of one-storied glaring white houses, built in the style of a Pompeian dwelling. A square, flat-roofed building, with an open courtyard or *patio*, in the centre, on to which all the rooms open; a fountain and a flower-garden in the patio; towards the street the windows, if any, small and heavily barred with iron—such is the residence of a South American Spaniard, a retiring sort of dwelling, shutting itself jealously from the outer world with a Mussulman-like love of seclusion. The populace, too, how different from that of a Brazilian city! no negroes here, and no ugly-looking Portuguese; but handsome and dignified Spaniards, with a good deal of Indian blood in the veins of the lower orders of them. Cleanest of cities is Monte Video, with straight streets cutting each other at right angles in the American chess-board fashion."—(*Rumbold*.)

Since the last century the harbour has greatly shoaled, and is now accessible only to vessels drawing 10 or 12 feet, so that the transatlantic liners have to ride at anchor in the exposed roadstead. But several improvements have been effected, including breakwaters, wharves, repairing docks, and the removal of the quarantine station from Ratas Island in the harbour to Flores Island some 12 miles farther east. But the surf still rolls in from the south, and will continue to do so till the money can be found to construct another breakwater farther seawards.

But despite all the difficult and even dangerous approaches, trade still continues to gravitate towards Monte Video, whose geographical position at the entrance to the Platean regions presents many advantages. As many as twenty lines of steamships touch at this port, where large repairing docks have been constructed at the foot of the Cerro. It has been proposed to create a great harbour in deep water by enclosing the Bay of Buceo some six miles east of Monte Video, although this inlet lies beyond the roadstead. But the plans of the English engineer have been found too costly to be entertained for the present. The project is also vehemently opposed by the merchants who are interested in

keeping the centre of trade in its present position at the extremity of the peninsula.*

The local industries comprise vast *saladeros*, "meat factories," on the slopes of the Cerro. Most of the factories belong to foreigners, and even the nursery grounds are chiefly in the hands of the French Basques. On holidays, crowds resort to *Paso Molino*, *Union*, *Cerrito* and other suburban retreats, and in summer *Playa Ramirez* and *Pocitos* on the Atlantic are much frequented by bathers. The railways radiating in various directions enable the better classes to reside at *Piedras*, *Canelones*, *Sauce*, *Pando*, at some distance from the capital. Good water is drawn from the Rio de Santa Lucia, 32 miles to the north, with a large reservoir at Piedras 100 feet above the level of Central Square.

MALDONADO—MELO—ARTIGAS.

Maldonado, on a semi-circular bay, resembling that of Monte Video, and sheltered from the east by the southernmost headland of Uruguay, offers better anchorage than the capital, but it is too far removed from the entrance to the Plate estuary, and is consequently little frequented by shipping, except when one of the chronic revolutions endangers the approaches to Monte Video. Gold-hunters often land at Maldonado, the nearest port to the auriferous district of *Minas*, where, however, few fortunes have been made.

On the Atlantic seaboard, north of Maldonado, the chief places are *Rocha*, near the coast, *Treinta y Tres*, so named from a band of "thirty-three" heroes in the Brazilian war of 1825; *Nico Perez*, terminal station (1893) of the railway which is ultimately to connect Monte Video directly with Rio Grande do Sul; *Melo* (Cerro Largo), with lead, copper, and coal mines, besides fine granites and porphyries; lastly, *Artigas*, facing the Brazilian town of Jaguarão, on the opposite side of the Rio Jaguarão.

SOCIAL AND MATERIAL CONDITION OF URUGUAY.

Despite foreign and domestic wars, revolutions, and political troubles of all sorts, the population of Uruguay has steadily increased since the close of the eighteenth century, having advanced from 30,000 in 1796 to nearly 702,000 in 1891. This increase is due in about even proportions to the natural excess of births over deaths and to immigration, although many of the arrivals from Europe pass on to Argentina after a short stay in the country. As in Brazil and Argentina, the great majority of the immigrants are Italians, who at present represent about one-seventh of all the inhabitants. Another important element are the Basques, who probably constitute over one-half of the 100,000 French and Spaniards now (1894) settled in Uruguay.

* Knight, *Cruise of the Falcon*, I., p. 106.

AGRICULTURE.

Agriculture and pasturage constitute the main sources of wealth, and with the increase of population cultivated land continues to encroach on the grazing-grounds. In 1891 about 1,200,000 acres were estimated to be under wheat, maize, and other crops, the yield of which already exceeds the local demand. The vine, unfortunately already attacked by phylloxera, flourishes, especially in the Salto district.

Of the live-stock, sheep alone have increased in recent years; both horses and horned cattle, though still relatively very numerous, having greatly fallen off during the last decade. Mulhall estimates the annual returns from stock-breeding at about £7,500,000, and from husbandry at £2,500,000, most of this wealth being owned by strangers. Landed property is burdened with heavy mortgages, amounting in the aggregate to £4,000,000 in 1893. In the territory of the Republic are comprised 20,000 urban and 25,000 rural estates exceeding £120 in value, and consequently subject to the impost. It thus appears that nearly one-half of all the heads of families in the State are freeholders. According to the returns of the national wealth, more than half of the public domain belongs to foreigners, mostly Basques and Italians; but towards the frontiers of Rio Grande the richest landowners are Brazilians. In Monte Video itself two-thirds of the real estate is in the hands of immigrants from Europe.

THE MEAT-PACKING INDUSTRY.

As in Argentina and Rio Grande do Sul, but even to a relatively greater extent, various preparations of meat form the staple industry. Till recently the animals ran free on the pastures, and the heaviest work of the *estancias* was connected with their capture, branding and sorting for sale, the shambles, or stock. But these antiquated methods now survive only in the northern provinces. In the south, where the land has risen greatly in value, the cattle are no longer allowed to run free, but are confined to enclosures, and more carefully tended. About a million are slaughtered every year, partly for the local demand, which may be estimated at about one per head of the population, partly for treatment in the *saladeros*.

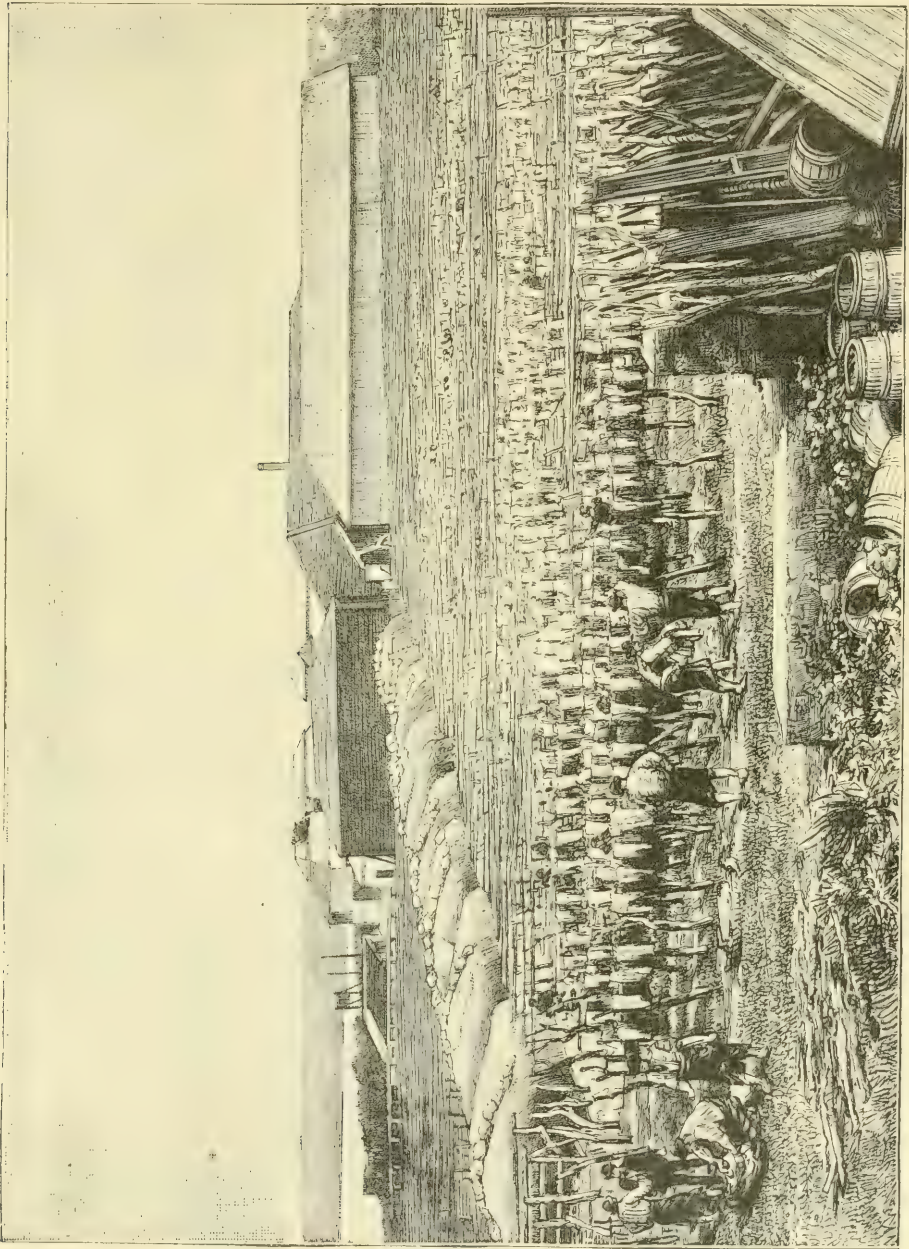
None of the various attempts to export the meat in a frozen state have proved quite successful, the process being attended by a loss of flavour. Hence a general return has been made to the old methods of tinning and jerking, though the work is carried on with greatly improved appliances, and in a much more methodic manner. In the large *saladeros* there is no waste, everything—hides, suet, bones, offal—being utilised, and much of the refuse converted into valuable fertilisers.

TRADE—COMMUNICATIONS—EDUCATION.

Of the foreign trade, which continues to increase from decade to decade, about four-fifths consist of the products of the *saladeros* and of the cattle-farms.

Uruguay's chief customer is Great Britain, followed by France, Brazil, Belgium, and the United States, in the order named. Over two-thirds of the traffic and nearly three-fourths of the navigation are centred in Monte Video.

Fig. 141.—A SALADERO AT SALTO.



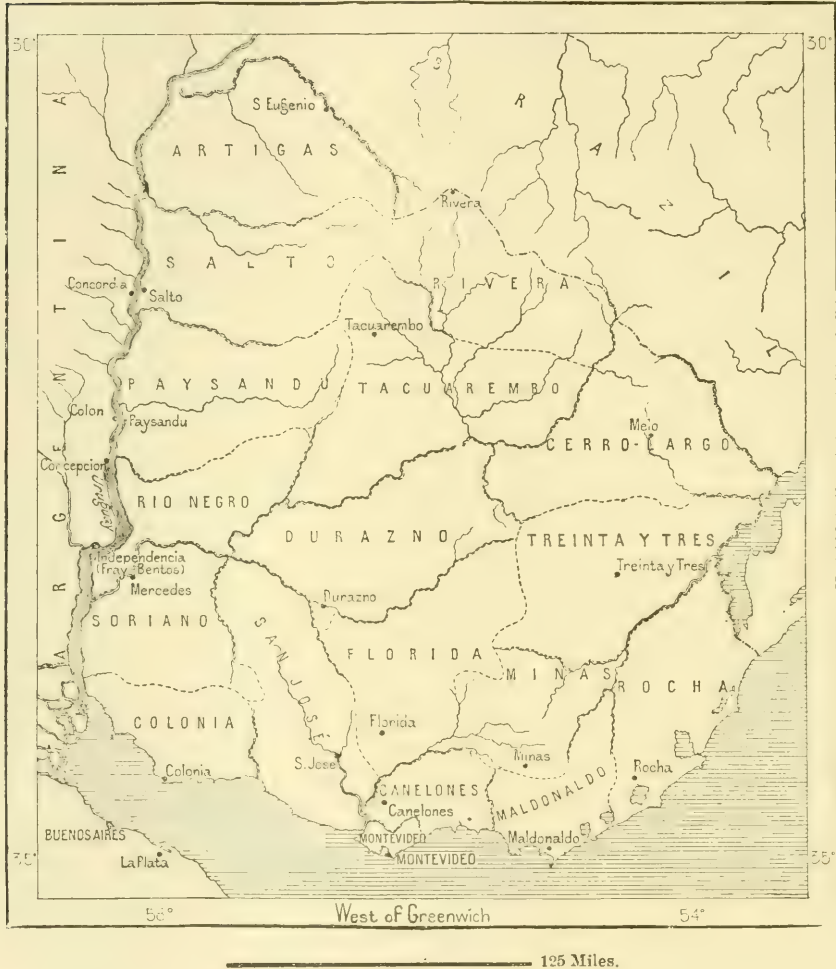
The railway system, of which the first section was opened in 1869, is still far from being developed, even in the Monte Video district, although it already reaches the Brazilian frontier. No trunk-line has yet been constructed to connect the banks of the Uruguay with the Atlantic coast or with the Laguna Mirim. On the

other hand, both the telegraph and postal services are efficiently conducted, and Uruguay, judged by the test of its public correspondence, takes a higher place, not only than Brazil and Argentina, but even than several European states.

The same remark applies to the public instruction, nearly one-tenth of the population attending the national and private schools. The bulk of the people

Fig. 142.—POLITICAL DIVISIONS OF URUGUAY.

Scale 1 : 5,000,000.



are Roman Catholics, but freedom of worship is absolute in theory and practice. At the census of Monte Video in 1889 over 3,500 declared themselves "Free-thinkers," while nearly 7,000 were returned as of "no religion."

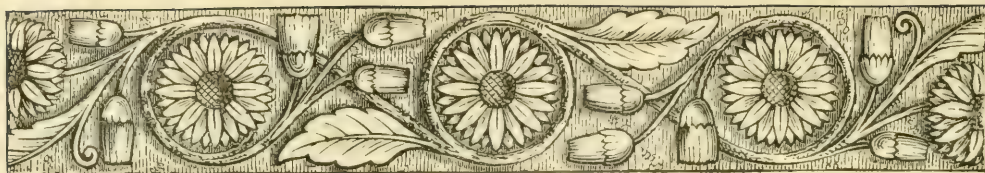
GOVERNMENT.

The Constitution conforms to the usual Hispano-American type—universal suffrage, two chambers, and presidential functions. But, as in so many other

Central and South American States, the charter of rights is a document for the most part pigeon-holed, while the country is torn by rival factions resorting, not to constitutional methods, but to force, intrigue, bribery, at times even foreign aid, in support of their claims. Frequently the public revenues have been employed for party purposes rather than for the public good, while future receipts have been discounted by burdensome loans, the interest on which has remained unpaid. Between 1880 and 1890 the yearly revenue has averaged £2,300,000 and the expenditure £3,500,000, about half of the former being derived from Customs. The army, which costs from £600,000 to £800,000, comprises about 4,000 of all arms.

Uruguay is administratively divided into nineteen departments, which with their areas and populations are tabulated in the appendix.





CHAPTER XVII.

ARGENTINA.



BOTH in extent and population the Argentine Republic ranks amongst the foremost states of South America. It is surpassed by Brazil alone in superficial area, and by Brazil, if not also by Colombia in the number of its inhabitants. But Colombia must in this respect soon be distanced, thanks to the stream of immigration settling towards the Platean regions. In 1893 the population appears to have exceeded 4,000,000 in an area of about 1,125,000 square miles.

In all attempts to forecast the probable destinies of the Argentine region, the chief geographical factor to be considered is its relative proximity to the European world. Despite the appearances and despite the evidence afforded by the maps, the shores of the Plate estuary lie, for all practical purposes, nearer to Europe than the northern seaboard, which *de facto* is situated half as near again to that Continent, for the Plate estuary beyond all doubt exercises a greater attraction on the European populations, and has consequently hitherto received the larger share of their trade, capital, and emigrants. In such international movements mere distance, so largely neutralised by rapid steam navigation, is far less important than remoteness from the equator, similar conditions of climate, vegetation, and social habits, in all which respects the Argentine lands contrast favourably with Amazonia and most parts of the Brazilian seaboard.

PROGRESS OF DISCOVERY.

This southern section of the Continent remained unvisited by Europeans for seventeen years after the discovery of the New World by Columbus. In 1509, Vicente Pinzon and Diaz de Solis entered the Plate estuary, and in 1520, Magellan, accompanied by Pigafetta, historian of the circumnavigation, passed through the strait between the mainland and Fuegia, which bears his name. The estuary

BUENOS AYRES, LA PLATA AND THE ESTUARY.



and the strait sufficed to enable cartographers to figure with tolerable accuracy the true form of the east coast of the Continent. But the bleak shores of Fuegia and Patagonia were too forbidding to attract explorers to the interior of those regions at a time when so much remained to be done in more promising lands.

Hence researches were confined to the inlets, sounds, and straits in the hope of finding some through passage from ocean to ocean. Thus Francisco de Hoces penetrated in 1527 to the neighbourhood of the "Land's End," but no colony was founded in these regions, while the Spaniards were endeavouring to secure firm footing in the land watered by the river which at that time bore the name of Rio de Solis from its discoverer. Diaz de Solis had returned to these waters in 1516, but only to fall in a fray with the natives on the banks of a coast stream in the Banda Oriental. In 1538 Sebastian Cabot pushed much farther inland, penetrating to Paraguay, and erecting a fort at the confluence of the Parana with the Carcaraña on the spot where now stands the town of Gaboto, so called from the Italian form of his name.

Cabot was the first to perceive that the estuary of Solis and one of the great rivers discharging into it might become an excellent highway of access to the regions of *Plata*, "Silver," that is to Bolivia and Peru. Hence the curious misnomer of "Argentina" or "La Plata" applied to a region not by any means noted for the importance of its silver mines. The Peruvian and the Bolivian Andes are the true *Argentina*.

But the colony founded by Cabot could not be maintained, and a few years afterwards the Spaniard, Mendoza, settled on the south side of the estuary, on the spot where now stands Buenos Ayres. Compelled by the Indians to abandon the settlement, he withdrew with his little party to the fortalice of Carcaraña, whence his lieutenants made numerous excursions in the surrounding districts. Ayolas, one of these pioneers, founded the station of Asuncion on the left bank of the Paraguay, which afterwards became the capital of the Republic.

Then he ascended the river as far as Matto Grosso, and advancing boldly into the savannas of the plains, the yungas of the foothills, and the Andean forests, he at last reached Peru in 1537. Ayolas was thus the first of all the conquerors to cross the Continent from sea to sea. He was followed seven years afterwards by Irala, who performed the same feat, and henceforth Spain held the lines of communication between the eastern and western sections of her vast South American domain. In 1542, a no less daring expedition was carried out by Alvar Nuñez, who made his way from the coast of Brazil by the rivers and portages directly to Paraguay.

In 1575, Juan de Garay recovered Buenos Ayres, where he succeeded in maintaining himself and developing the settlement. The true contour lines of the Magellanic coasts were determined in 1579 by the pilot Sarmiento, one of the most remarkable mariners on record, and during the two following centuries the whole region was explored between the Plate basin and the rampart of the Andes. But in the extreme north and south the savage aborigines arrested, and frequently drove back, explorers and settlers. On the one hand the Abipons, Mocovi, and

Guaycurus of Gran Chaco, on the other the Pampas tribes of Patagonia, valiantly maintained their independence against the white invaders.

The Jesuit, Falkner, after residing several years amongst the Patagonians at the foot of the Sierra del Vulcan, first described the interior of the country in the southern part of the Pampas region. His work, followed in 1772 by the writings of Cook's companion, Forster, again aroused the attention of the Spanish Government, and caused a revival of the explorations which had been suspended for nearly two centuries.

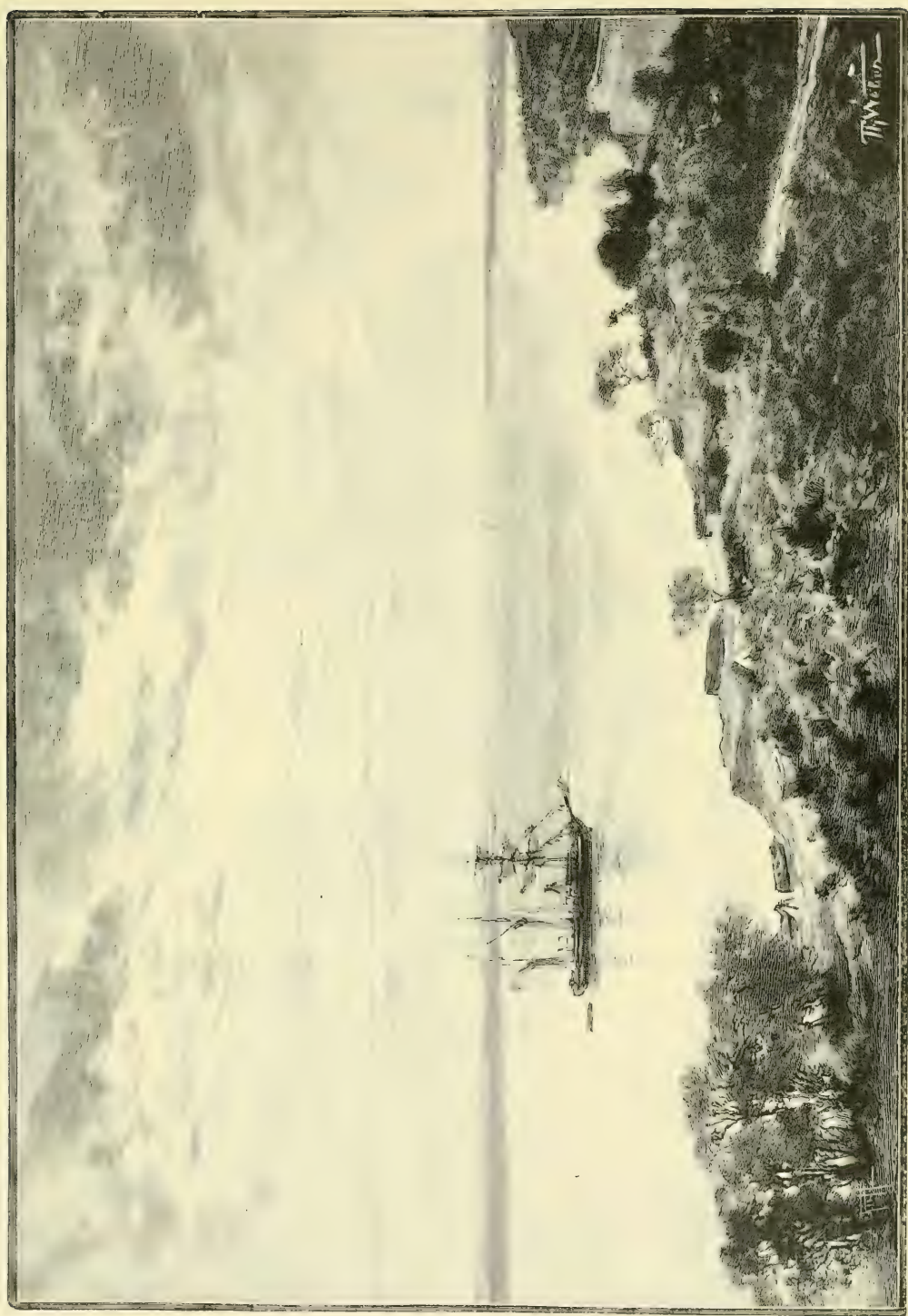
In 1778, four years after the appearance of Falkner's work, Juan de la Piedra visited the stormy gulf of San Matias, called also Bahia sin Fondo, "Fathomless Bay," and here discovered the spacious haven of San José. Between 1779 and 1784, the brothers Viedma, followed a few years afterwards by Malaspina, coasted all the inlets along the southern seaboard; but their reports were consigned to the royal archives and forgotten. These coast surveys were supplemented by excursions into the interior, and in 1782 Villarino even ascended the course of the Rio Negro as far as the foot of the Andes. In the same year Antonio de Viedma discovered the lake which bears his name.

GEOGRAPHICAL RESEARCH.

The scientific study of the Platean regions was ushered in by Felix de Azara, who had been officially commissioned to determine the Hispano-Portuguese frontiers on the Uruguay, Parana, and Paraguay rivers; but far from confining himself to geodetic surveys, Azara also studied the physical features and natural history of these regions. De Souillac and de la Cruz, other officers in the Spanish service, crossed the passes of the Cordilleras, and fixed their position.

But the war of independence was now imminent, and henceforth neither the Spaniards nor their emancipated descendants in the New World continued to take a serious part in geographical exploration. Thanks, however, to the abolition of the exclusive Colonial régime, foreigners were now able to co-operate with the natives in this work. Thus D'Orbigny, after taking up his residence at Carmen de Patagones in 1826, passed into Corrientes to prosecute his researches on the American aborigines embodied in his classical work, "*L'Homme Americain*." Then followed in 1833 the memorable expedition of the *Beagle* and *Adventure*, described by Darwin in the "*Voyage of the Beagle*," an epoch-making work in the history of the natural sciences. Dalton Hooker, another English zoologist, who accompanied the *Erebus* and *Terror* expedition, studied the natural history of Fuegia, and described the "*Antarctic Flora*."

The geography of Argentina proper is now known in all its main features, and nothing now remains except to fill in the details. This complementary work is in daily progress, thanks to the miners exploring the treasures of the mountains, the engineers engaged in laying down railway routes and regulating water-courses, the land surveyors commissioned to measure and apportion the public domain.



THE PARANA—VIEW TAKEN AT HERNANDARIAS.

But along the frontiers there still remain almost unknown tracts, either held by hostile Indians, or too difficult and dangerous to traverse. Thus the Chaco region, occupied by the fierce Tobas, still contains some spaces, either untraversed or crossed by itineraries, which have not yet been harmonised at all points. In the north-western highlands, with their snowy peaks, the network of passes presents doubts, which have not been solved in the same way by all cartographers. Lastly, the study of the triangular Patagonian region has cost great labour, while the section of the Andes separating the Atlantic slope from the western fiords remains to a great extent still unknown.

Patagonia itself has been visited and explored by numerous travellers, naturalists, and geologists, mostly following in the track of the old missionaries, who crossed from the Chilian heights to the Argentine plains. Punta Arenas, the Chilian station on Magellan Strait, has also been a starting-point for various excursions to the interior, while other explorers have penetrated inland from the various agricultural, pastoral, and military settlements along the eastern seaboard. Patagonia has thus been completely assimilated to the rest of Argentina by the labours of Descalzi, Cox, Gardiner, Moreno, Musters, Ramon Lista, Moyano, Fontana, Rogers, Popper, Vinciguerra, Ameghino, Roncagli, Burmeister, and many others, as well as by the military expeditions sent against the aborigines. Paleontologists and geologists also are systematically studying the land in the interests of the La Plata Museum, and other collections; stockbreeders are examining the grassy bottom lands, and prospectors are exploring the mineral deposits of the country, and thus the era of accurate geographical research has begun for Patagonia, as well as for the rest of Argentina.

Subjoined is a chronological table of the chief explorations in Patagonia since the war of independence :—

- 1827. Stokes (Santa Cruz).
- 1832 *et seq.* Fitzroy and Darwin (Santa Cruz, Chubut, Rio Negro and Sierra Ventana).
- 1833. Descalzi (Rio Negro).
- 1854 *et seq.* Jones (Chubut).
- 1856. Fonck, Hess (Nahuel-Huapi).
- 1857. Bravard (Sierra Ventana).
- 1862 *et seq.* Guillermo Cox (Andean Passes).
- 1867. Gardiner (Santa Cruz, Lake Argentina).
- 1869. Musters (foot of the Andes, Rio Negro).
- 1872. Guerrico (Rio Negro).
- 1874 *et seq.* Moreno (Rio Negro, Santa Cruz, Chubut, Lake Argentina, etc.).
- 1876 *et seq.* Moyano (Rio Chico, Lake Buenos Ayres, Chubut).
- 1877. Rogers and Ibar (Lake Argentina, Andean Passes). Beerholm (San Julian, Gallegos).
- 1878 *et seq.* Ramon Lista.
- 1879 *et seq.* Wysoski (Chubut, Rio Negro). Lorentz (Neuquen).
- 1882. Roncagli (Gallegos, Santa Cruz).
- 1883. Rohde (Nahuel-Huapi, Pass of Bariloche). Zeballos (Rio Colorado, Rio Negro).
- 1885 *et seq.* Fontana (Upper Chubut).
- 1886 *et seq.* Carlos Burmeister (Chubut, Santa Cruz). Popper (Fuegia).
- 1887. Asahel Bell (Upper Chubut).
- 1891. Siemiradzki (Colorado, Negro, Limay, Nahuel-Huapi). Bodenbender (Neuquen).
- 1892. Machon and Roth (Andean Valleys, Senguel, Chubut).

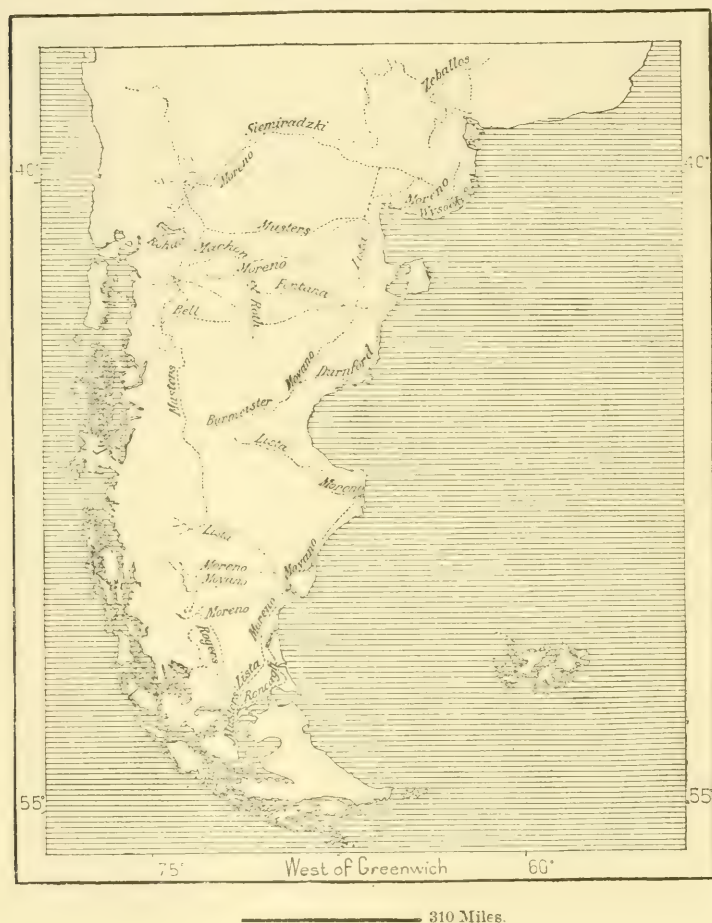
The abundant materials already collected on the relief and geology of Argentina, as well as on its natural history and inhabitants, have been embodied in

several valuable works, such as those of Hermann Burmeister and Martín de Moussy. A common direction is also given to individual studies by such establishments as the Buenos Ayres Institute, the La Plata Museum, and the University of Cordoba.

Nevertheless, the Argentine Republic still lacks a good topographical map analogous to those of West Europe, the United States, Mexico, and parts of Brazil. In 1882 the Buenos Ayres Geographical Society resolved to prepare a

Fig. 143.—CHIEF ROUTES OF EXPLORERS IN PATAGONIA.

Scale 1 : 20,000,000.



general atlas of the Republic in states and territories. This atlas has been completed, but only a few of the maps are based on direct surveys. In 1889 the Argentine Government exhibited at Paris a relief of the whole territory to the scale of $\frac{1}{3000000}$, and the materials collected for this work have since been utilised for the construction of a map to the scale of $\frac{1}{1000000}$. The Astronomic Observatory of Cordoba, whose positions have been carefully determined,* has been

* South Lat.. $31^{\circ} 25' 4''$; Long., W. of Greenwich, $64^{\circ} 12' 3''$.

taken as the starting-point of Argentine topography. Geodetic surveys have also been aided by the accurate determination of several other places, such as Rosario, Rio Cuarto, Mendoza, Santa Fé, La Paz, Goya, Corrientes, San Luiz, Villa Mercedes, Villa Maria, Tucuman, Salta, San Juan. From year to year fresh studies will enable the geographer to fill in the details, and to embody in a single map the numerous local documents possessed by every province and city of Argentina. But in the more remote districts how many obscure problems still remain unsolved! A case in point is the position of Tarija, which, since the time of d'Orbigny (1839), has been variously fixed on the maps with differences of as much as 48 minutes of latitude, and one degree 45 minutes of longitude.

BOUNDARIES—FRONTIER QUESTIONS.

In the absence of accurate maps the boundaries have not yet been everywhere determined, either between the several provinces, or between the Republic and her neighbours. Even in the estuary the islet of Martin Garcia, whose position between the Parana and Uruguay confluence gives it great strategic importance, has been assigned to Argentina, although it belongs geographically to Uruguay. Hence the possession of this narrow rock, of no agricultural or industrial value, has often been hotly contested by the rival States.

Towards the Paraguay the frontier question has been settled by force, and here Argentina has acquired the territory of the "Missions," which forms an enclave between the Parana and the Uruguay. She also claims the other Jesuit Missions, which have been annexed to the Brazilian State of Santa Catharina, and which comprise a strip of about 12,000 square miles in extent. West of the Paraguay, the part of Chaco lying beyond the Pilcomayo was awarded to the Paraguayans by a decision of 1875. But in the extreme north the Argentine maps still trace as the legal boundary the northern frontier of the province of Tarija, which had been attached by a royal decree to the administration of the Argentine town of Salta, but which had "opted" in 1825 for annexation to Bolivia.

In the west the frontier towards Chili has been settled in a general way by the treaty of 1881, according to which "the dividing line is drawn across the highest summits indicating the watershed." This clause involves a certain contradiction, for such a line does not coincide exactly with the sinuosities of the waterparting. Differences of opinion must therefore inevitably arise, especially when the limits in the Patagonian Andes come to be settled, for here the cordilleras are interrupted by numerous gaps, and are even turned by the labyrinth of fiords which penetrate into the eastern plains. But provision is made in the treaty for the settlement of all such disputed points by arbitration.

In Fuegia the frontier arrangement leaves no question open to doubt. Hence there seem no pretexts left for the angry discussions which, nevertheless, break

out from time to time in the respective presses and parliaments. Relying on their successful wars, and on their military organisation, modelled on that of

Fig. 144.—MARTIN GARCIA.

Scale 1 : 20,000.



Germany, the Chilians believe themselves invincible, while the Argentines, owning a larger, if not a richer, domain, are not disposed to take a second place amongst the Spanish Republics of South America.

ARGENTINA AND THE ARGENTINES.

But compared with that of Chili, the power of Argentina is greatly impaired by the lack of political unity. Except in the war caused by Balmaceda's dictatorship, Chili, although divided into two hostile classes, has hitherto preserved at least an outward semblance of domestic harmony. But Argentina has been the scene of countless local revolutions, and occasionally even of sanguinary wars embracing the whole of the Republic. Since the close of the colonial rule, the Argentines have lived in a chronic state of civil strife, relieved only by intervals of peace or armistices.

This combative spirit and indifference to scenes of bloodshed may perhaps, to a small extent, be due to heredity, or to the carnivorous habits of the people. But the chief cause of the lack of political stability must be sought in the persistence of the struggle between two opposite principles, that of local self-government and an aggressive centralisation inherited from the old monarchical system. And after all, it may be asked, is the difference so great between the revolutionary outbreaks of Argentina and the formidable state of armed peace under which old Europe threatens to break down?

An apt illustration of the friction constantly arising between the local and federal Governments is afforded by the course of recent events in Buenos Ayres, which had long been the capital both of the province of that name and of the Argentine Republic. "Until 1880 the province of Buenos Ayres dominated the Argentine Republic. In wealth and population she outweighed the other provinces, although in area they vastly exceeded hers in size. But with the growth of the provinces the domination of Buenos Ayres was threatened. This was too much for her pride, and the provincial government, being no longer able to rule, determined in 1880 to secede from the Confederation. The provincial leaders were eager enough for independence, but the people were only half-hearted about it. They were more intent upon their crops, their business, and their profits, than upon the political status of their province. The result was that, after a short, hollow struggle, the revolt collapsed, and the provincial government had to take up a subordinate position.

"But this was not quite all. The provincial government had hitherto enjoyed the privilege of raising troops of their own. Had it not been for this, the attempt to secede could never have been made. The national government now withdrew from the provincial government this privilege, and the provincial government were, moreover, given to understand that there was no longer any room for them in the city of Buenos Ayres. This was the reason of the rise of the new provincial capital of La Plata. The fiat of the provincial government went forth, a site was chosen, and, thirty miles from Buenos Ayres, in three years, out of the bare plain, the new capital of the province arose. Nothing could be more striking than to see, side by side, the grand new station rearing itself loftily alongside the little wooden shed which was still doing duty until the new station should be finished." *

* Dr. E. R. Pearce Edgcumbe, *Zephyrus*, p. 191.

The Argentines have the ready wit and marvellously receptive intelligence of the Spaniards. They are bold and daring, and, compared with their Brazilian neighbours, have a more resolute character, a more decided will, proceeding more promptly and vigorously to action. They also yield to intense feelings of enthusiasm under the impulse of generous ideas, and few national displays could compare in grandeur and exuberant rejoicings to the demonstration caused by the abolition of slavery in Brazil. All were overjoyed at the disappearance of this foul spot from American history, and they felt themselves brothers of those Brazilians whom they were hitherto wont to speak of as "hereditary foes."

In their ambition to do "big things" they have, in prosperous times, really developed their material resources with a fiery energy which has dazzled the North Americans themselves. Towns sprang up in the wilderness, and the camping-grounds, one day occupied by savages, were the next importing steam engines, starting telephones and newspapers.

But the evil days have returned. The great undertakings floated with foreign capital with no thought of the future have not all succeeded, while those that have yielded returns have chiefly benefited the speculators and large landowners. The rapid enrichment of a few, and the ruin of others, resulted in general demoralisation, and while capitalists were gambling with the public funds the politicians were scrambling for office.

Then came the sudden crash, when nearly all serious undertakings were arrested by failures, more or less disguised by financial jugglery. Once again it was seen how unstable is the equilibrium of a land in which the common weal does not rest on the labour of a free peasantry, and where industrial progress is due, not to local enterprise, but to foreign speculation.

Nevertheless the natural resources of the country are so great that financial crises, however long and disastrous they may be, may retard, but cannot permanently arrest the progress of Argentina. In spite of everything the population continues to increase, the tide of immigration has again set in this direction, the area of land brought into use is daily extended, and enterprise has begun to penetrate into the two sections of the Republic which hold the greatest treasures in reserve. These are in the north-west the territory of the Missions, and in the west the Andean uplands about the sources of the Colorado and Rio Negro. There is room for millions of settlers in these regions, favoured as they are by a fertile soil, pure air, and a delightful climate, entirely suitable for the constitution of immigrants from Europe.

PHYSICAL FEATURES.

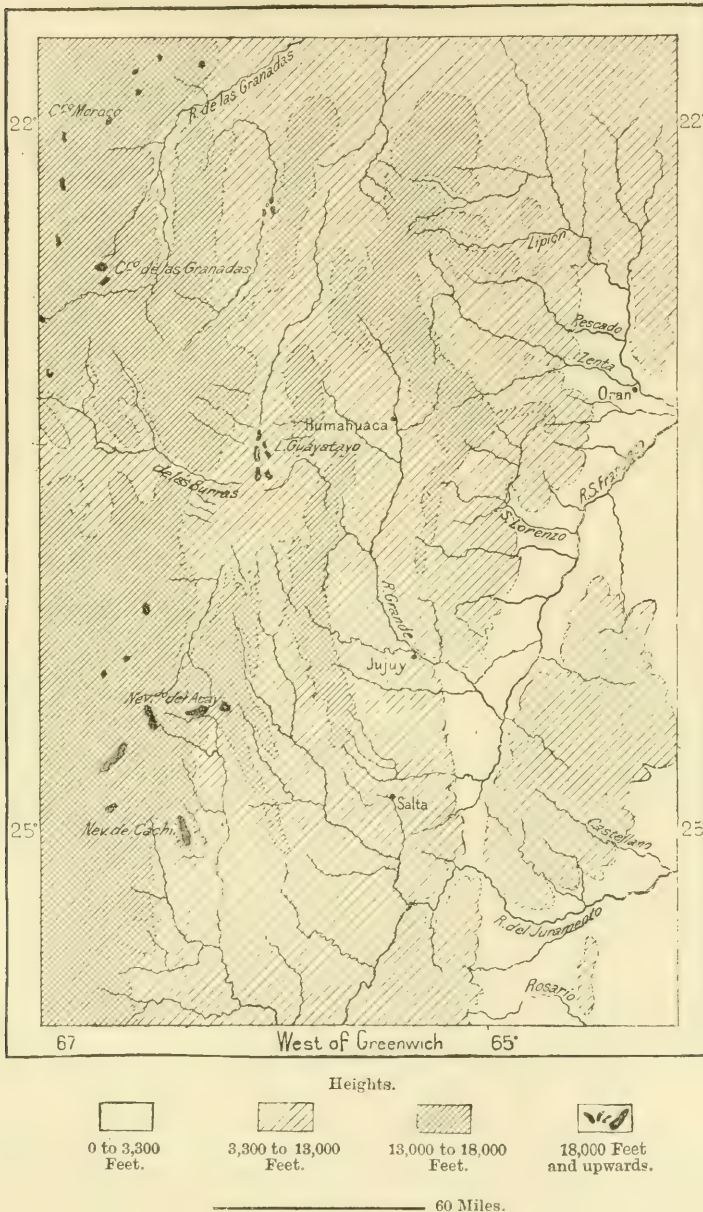
Viewed as a whole, the surface of the land is found to have a slight general incline from the Andes to the Atlantic. But this uniformity is broken at various points by rising grounds and rugosities, and in Patagonia even by some isolated mountain masses rising at some distance from the Andes.

The Andean system, which occupies such a broad stretch of territory in Bolivia

and North Chili, extends also into north-west Argentina between the Pilcomayo, Bermejo, and Juramento slopes. Above the huge pedestal, standing at a mean altitude of 14,500 feet, rises a regular line of peaks in the direction from north to

Fig. 145.—NEVADOS PLATEAU, NORTH-WEST ARGENTINA.

Scale 1 : 3,500,000.



south exceeding 11,600 feet, and covered with snow throughout the year. The Cerro de las Granadas, one of these superb peaks, towers above the dreary solitudes of the puna at the north-west corner of the Argentine frontier.

Interrupted southwards by the deep gorge of the Rio de las Burras the plateau falls to less than 13,000 feet, but farther on again rises to great altitudes in the *Nevados* or snowy crests of Pasto Grande, Acay, Cachi, and others. Even farther east, the plateau, although deeply ravined and carved into promontories and isolated ridges, still presents several summits over 10,500 feet high, and snow-clad for a part of the year. In the sierra which skirts the west side of the Jujuy valley the Nevado de Chañi and the Tres Cruces attain an elevation of over 18,000 feet. North of Jujuy the Zenta range, projecting like a long promontory beyond the plateau, is crossed at the Zenta pass by the route from Oran to Humahuaca at an elevation of 14,780 feet, while other summits in the same range rise to 16,400 feet. Yet the snow which sometimes falls melts almost immediately. In this dry climate, and under this latitude (24° S.), the lower limit of the snow line would probably lie between 18,000 and 20,000 feet.

All these highlands and plateau escarpments preserve traces of the ice-cap which formerly descended far into the plains. The whole region had certainly its glacial epoch, perhaps, even successive periods of glaciation. Everywhere the foot of the mountains is flanked by terraces a few hundred yards high, where gravels are intermingled with layers of sand. These and other analogous phenomena can scarcely be explained by the simple action of water and the deposit of alluvial matter.

ACONQUIJA AND FAMATINA UPLANDS.

West of Salta the chain of mountains skirting the plateau recedes continually westwards, diminishing in breadth as well as in height in the direction of the south. Here the system has been deeply scored by running waters. One lofty ridge has even been completely detached from the Andean uplands by arid spaces, gradually worn down to their present level by glaciation and erosion. The Sierra d'Aconquija, as this isolated range is called, stretches in a sinuous line from north to south, west of the Tucuman plains. Including its extreme offshoots it has a total length of no less than 280 miles between the great bend of the Juramento and the headwaters of the Rioja. But the Aconquija proper, which is disposed in the direction from north-east to south-west, is scarcely more than 30 miles long. It falls very abruptly on its west side facing the Andes, but slopes more gently eastwards, where it is flanked by foothills which are wooded here and there. From the Clavijo, as the central mass is called, the spurs branch off in various directions—in the north, the Cumbres de Calchaqui; in the west, the Sierra del Atajo; in the south, the Ambato range; in the south-east, the Altos, continued by the Ancaste mountains. In the winter of 1893, the geologist, Rodolfo Hauthal, scaled for the first time the culminating peak of the Aconquija system, which he calculated to be 17,720 feet high. Before attacking the dominating cone he had passed two days at an altitude of 14,760 feet, in a fissure of the rocks under shelter from a furious gale. Although situated in the temperate zone, Aconquija has no glaciers, though clear traces survive of former crystalline streams. At a height of 15,420 feet,

Hauthal discovered two lakes, evidently of glacial origin, dammed up by a barrier of frontal moraines.

The Nevado de Famatina, which rises over 125 miles to the south-west of Aconquija, resembles this mass in its imposing aspect, especially when seen from its southern slopes. But, unlike Aconquija, it is not completely detached from the Andean plateau, with which it is still connected by a ridge of heights disposed in a line with the main axis of the system. According to Naranjo, by whom it has been ascended, Famatina overtops Aconquija, being 20,680 feet high, and even appearing much higher relatively to the surrounding plains, which here fall to from 3,000 to 4,500 feet above sea-level.

Granites and porphyries form the framework of the range, the lateral rocks consisting of white, red, and black metamorphic schists. In the direction of the south it is continued by a chain, which gradually diminishes in height, and at last merges in the region of saline depressions. This chain may be regarded as belonging to the same system of low ridges and hills which follow in lines parallel with the main crests of the cordilleras. Such are the Sierra de Chaves, and the equally isolated Pié de Palo, east of the city of San Juan.

EASTERN AND WESTERN CORDILLERAS.

West of the Nevado de Famatina the contracted Andean plateau is decomposed into two parallel Cordilleras of about equal height, but contrasting in the character of their rocks. The western Cordillera forms the water-parting of the two slopes, as well as the political frontier between Chili and Argentina. The eastern, lying entirely within the Argentine State, is carved into fragments by the torrents piercing it at intervals, and carrying the detritus down to the plains. While the former, of much more recent origin, consists of mesozoic formations with later eruptive rocks cropping out here and there, the "ante-cordillera," or "pre-cordillera," as the eastern range is called, is formed of granites, porphyries, and paleozoic strata.

This outer chain was evidently the original backbone, and its decomposition had already set in before the Argento-Chilian frontier-range appeared above the surface. The whole of these uplands presents a certain resemblance to the equatorial Andes, which are similarly divided into two parallel chains, the western nearly continuous, the eastern broken into seven sections by the headstreams of the Amazons, and regarded by Whympfer less as a mountain range than a succession of groups without natural cohesion.

At the point where Famatina is rooted in the plateau, the two Cordilleras are not yet developed into distinct chains. Here the snowy peaks of Bonete, Veladero, and la Gallina Muerta rise in isolated grandeur to the relative heights of from 3,500 to 5,000 feet above the broad pedestal between the Chilian and Argentine slopes. This elevated plain stands itself at a mean altitude of from 13,000 to 14,500 feet above sea-level, and stretches away in gentle undulations beyond the horizon. On these bleak expanses the wind often blows with great fury, and is

accompanied by blinding snowstorms. In this region of the puna, the tracks followed by the muleteers across the plateau, between the upland valleys of the Rioja and Copiapo, take the name of *pircas*.

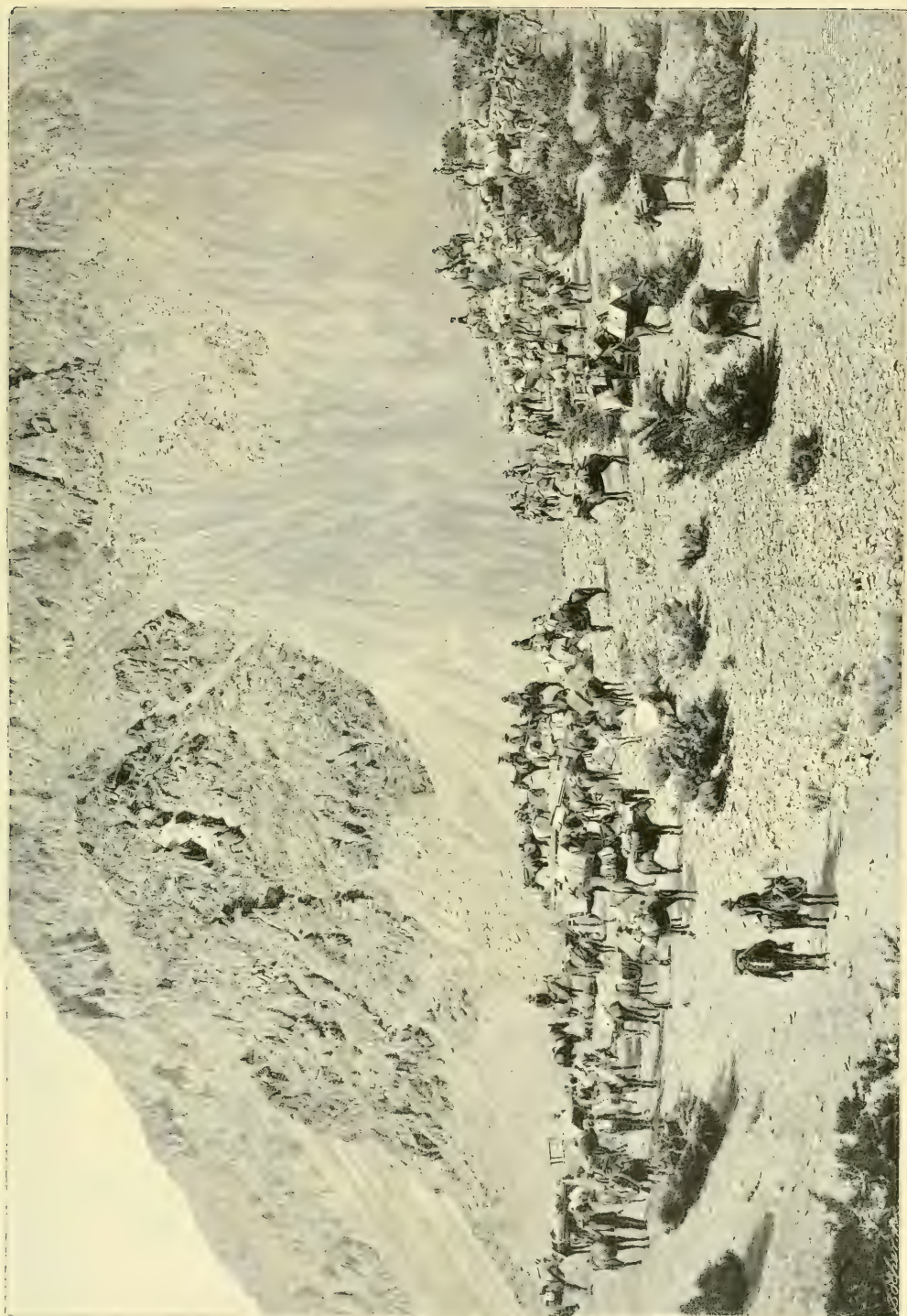
In that part of the plateau which bears the lofty peak of Bonete, the eastern Cordillera is carved into four distinct sections by the streams belonging to the Argentine drainage area. The first section, with some crests exceeding 1,600 feet, is separated from the Argento-Chilian Cordillera by the deep valley of the Rio Blanco, one of the main branches of the Rio de Jachal. The second, lying nearer to the frontier, develops the pico del Salto, and numerous other summits over 18,000 feet high. The third fragment of the eastern Cordillera broadens out into a huge mountain mass with peaks, such as Mainrique and Totora, also exceeding 18,000 feet, lower limit of the snowline. Lastly the fourth section, known as the Cordillera del Tigre (16,400 feet), is connected with mighty Aconcagua, towering above the valley traversed by the main route, which leads over the Cumbre pass from Buenos Ayres to Santiago de Chili.

All the tracks crossing the Andes between the Cumbre and the *pircas* of Copiapo, follow the course of the river valleys to turn the transverse barriers of the eastern Cordillera. But these tracks are little used, except for the importation of Argentine mules into Chili. But in 1817 a whole army of San Martin's republican forces advanced against the Spaniards over the pass of los Patos or Valle Hermoso, which stands at an altitude of 12,700 feet between Aconcagua and Ramada. Other breaches in the range followed by the muleteers exceed 14,750 feet, amongst others that of Agua Negra, or la Laguna (15,190), on the direct route between Jachal and Coquimbo.

THE LITTLE CORDILLERA—OVERO AND OTHER VOLCANOES.

Besides the eastern and western Cordilleras with their snowy peaks, Argentina, like Chili, has its chain of foothills, its "little Cordillera," running parallel with the axis of the Andes proper, and interrupted at intervals by deep river valleys. West of the plain occupied by the two cities of San Juan and Mendoza, these foothills develop the imposing Paramillo group, which in the Cerro Pelado attains a height of 11,280 feet. Although now free from snow, these mountains had at one time their glaciers, traces of which are still seen on the plain in the neighbourhood of Mendoza. Here the so-called *cerrillos*, little knolls with rounded crests, are evidently the remains of frontal and other moraines. They are disposed in ridges ranging from 150 to 300 feet in height, and consisting of trachytic blocks, angular or slightly rounded boulders brought down by the glaciers to the base of the foothills.

The depression in the Cordillera followed by the Cumbre route, and by the line of the future trans-Andean railway, coincides very closely with a natural division of the orographic system. A little south of the snowy Tupungato giant (20,286 feet), itself of eruptive origin, rise the craters of numerous volcanoes, some extinct, some still active. Here also the Argentino-Chilian Cordillera breaks into two



CONVOY OF MULETEERS AT THE FOOT OF THE CORDILLERA.

parallel ranges, the eastern lying entirely within Argentine territory, and on an average about 5,000 feet lower than the western.

The extinct Overo volcano (15,550 feet), which connects this eastern ridge with the loftier range, not far from Mount Maipo (17,670), is encircled by one of those glaciers, which afford the best opportunity for studying the formation of the *nieve penitente*, "penitent snow," "so called from the eccentric resemblance to cowed 'friars penitent,' affected by the frozen masses under the action of sun and wind. The crystalline parts, which resist evaporation and the melting process, ramify in the strangest fashion, in many places leaving the black ground exposed between the fantastic blocks of ice, which sometimes stand five or six feet high."*

MALARGUE AND THE SOUTHERN CORDILLERAS.

South of Overo the Argentine chain is interrupted by the valley of the Rio del Diamante, beyond which rise other crests disposed in lines parallel with the main range. A breach in which rises the Rio Atuel leads to the Planchon pass (9,920 feet), one of the most frequented in the Argentino-Chilian Andes.

Farther south the orographic system broadens out. Here the Argentine chain of the Malargue (Malalhué) volcanoes, which contrasts with the Jurassic formations of the main range, is developed to the east of the deep longitudinal valley of the Rio Grande or Upper Colorado.

Some 60 miles farther east, beyond a closed lacustrine basin remnant of a former inland sea, rises the lofty Nevado de San Rafael (16,190 feet), an almost isolated fragment of mountain masses which appear to have formerly been far more extensive than at present. Farther south the Cerro Payen, undoubtedly of igneous origin, dominates the valley where the Rio Grande and the Rio de las Barrancas unite to form the Colorado. Near the Buta-co pass, which crosses the Malargue chain at a height of 4,980 feet, is seen the Cura Cokalio, or "divine stone" of the Araucanians, a huge sandstone mass, which has fallen across the track from a neighbouring cliff.

According to Host, the Chos malal or Bum mahuida, in the eastern pre-Cordillera, has an altitude of no less than 16,400 feet. It is an extinct volcano surrounded on all sides by ashes, scorix, and lava streams. The whole of the eastern Cordillera in this region is believed to consist of these igneous rocks, which were ejected at two different epochs, the first represented by black trachytes, the second by basalts. A sill 7,610 feet high separates the volcano from the western Cordillera, and forms a divide between the waters flowing in one direction towards the Colorado, in another to the Rio Negro through its Neuquen affluent. The Andes have few more romantic sites than this pass in the "Argentine Switzerland," which commands a wide prospect of pastures and woodlands, bounded north-east by the gigantic Cerro Payen, north-west by the Campanario cone, with its crown of picturesque rocks affecting the form of ruined towers. Southwards the

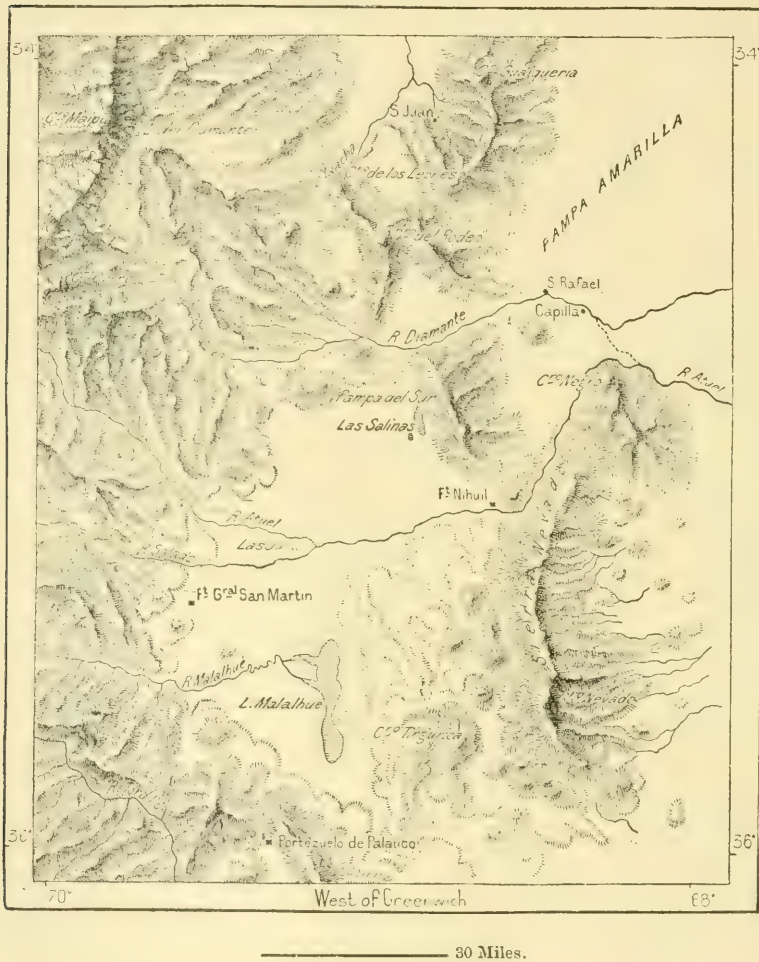
* Vol. XVIII., p. 416.

view extends over a chaos of mountains, which beyond Lake Tromen fill the space between the frontier range and the course of the Rio Neuquen. Even east of this river other heights are seen falling in the direction of the rocky Patagonian pampas.

East of the Lonquimai, Llaima, Rinihue, and Quetrupillan volcanoes, which follow southwards along or near the main crest, the Argentine Cordillera resumes

Fig. 146.—SAN RAFAEL NEVADO.

Scale 1 : 2,000,000.



its normal trend at an altitude sufficient for the summits to put on a snowy mantle in winter. The Chapel-co rises to a height of 8,000 feet, and the section of the system bearing the name of Cordillera de los Cipreses maintains an elevation of 6,550 feet.

But this section is broken by deep gaps, one of which, about the intermingled sources of the Chilian Biobio and Patagonian Limay, falls to little over 3,000 feet, and is accessible to wheeled traffic from the west. Farther south a gentle sloping

hill separates an affluent of the Rio Limay from the Chilian lake Picaullu (Lacar, Lajar), which stands about 2,400 feet above the sea, while the boquete de Perez Rosalez, a third pass at the western extremity of Lake Nahuel-Huapi, falls below 2,800 feet.

A second Argentine Cordillera, developed to the east of the first, is less ravined, but also less elevated, though the peaks in the Sierras de Catalin and de las Angos-

Fig. 147.—NAHUEL-HUALPI AND NEIGHBOURING MOUNTAINS.

Scale 1 : 1,200,000.



turas rise to 5,000 feet. This section of the Argentine orographic system had also at one time its active volcanoes, like the frontier Cordillera farther west. The Alumine, Mesa, and Chapel-co heights are all cones of Andesite, while scores of other peaks flank both sides of the Rio Collon-cura. Their extinct craters are now clothed with beech and myrtle groves; but a cone near the sources of the Biobio has laid all the surrounding districts under ashes. Here the traces of

former eruptions and of ancient glaciers are found superimposed. Below the igneous scoriæ stretch beds of glacial mud.

South of Tronador, with its "thundering" avalanches, towering between the Nahuel-Huapi basin and the Chilian slope, the Cordilleras fall so low that, according to Rohde, the traveller may pass from the banks of the Rio Limay to the deep Reloncavi fiord without crossing any range properly so called, but only some low plateaux intersected by gorges and valleys. At this point, which is perhaps the old Bariloche route followed by the Jesuit missionaries, the only obstacle to progress is the exuberant vegetation. The track descends to the Pacific Ocean along the course of the Rio Puelo, which is flanked on the north by Mount Ballena (4,886 feet), on the south by Mount Castillo (4,930 feet).

Farther on, along the deep channels separating the mainland from Chiloe and the Magellanic archipelagoes, the frontier range has been scarcely studied except from a distance. Here rise some extinct and active volcanoes, such as Yate or Yebcan, Minchin mahuida, Corcovado, and Mellimoya, ranging in height from 5,200 to 7,900 feet. From the few excursions that have been made to the interior, it may be inferred that the Cordillera is decomposed in distinct masses by the deep gorges of the rivers rising on the Patagonian plateaux east of the mountains. The Rio Palena, which flows south of Mount Corcovado, and which, according to the legend, should give access to the marvellous city of the "Cæsars," the South American Eldorado, winds through one of these gorges, while others are traversed farther south by the Rios Corcovado, Aysen, and Huemules.

In this region the Andes are, so to say, broken into a land archipelago, analogous to that developed in the neighbouring waters. The Cordillera reappears across the Taytao peninsula, where rises the superb crest of San Valentino, which towers to a height of 12,720 feet. Under the same latitude in the lateral Argentine Cordillera, Moyano measured the Zeballos peak (5,500 feet), and determined the existence of another chain, which towards the source of the Deseado branches off from the Andes in the direction of the south-east, terminating in the headland of Cape Blanco south of San Jorge Bay.

The actual height of this transverse range has not yet been ascertained, but according to native report it is extremely difficult to cross, owing to its rugged character, rocks, precipices, and general absence of water. Hence, in order to pass from one point to the other of the seaboard, the Indians pass round to the west, traversing the more practicable region of grass lands.

THE MAGELLANIC MOUNTAINS.

In the Magellanic region the contracted extremity of the Continent presents nothing but a narrow strip of plains between the Andes and the Atlantic, from which are visible the summits rising above the Pacific. But in this terminal peninsula the parallel zones of mountain ranges are disposed side by side with surprising regularity. The Cordillera proper, above which rises the superb tower-shaped Chalten or Fitzroy (6,890 feet), follows almost exactly the direction

of the meridian as far as the break which gives access to the waters of the great Magellanic fiords.

To this range follows eastwards a pre-Cordillera, to which Moyano has given the name of Cordillera de los Baguales ("Wild Horses"), and which stretches some hundred miles north and south, without greatly deviating from the meridional direction. Mounts Stokes and Payné belong to this system, whose crests range from 5,000 to 6,500 feet. A third less uniform and less elevated chain (5,000 feet) falls below the snow line, but exceeds the others in picturesque scenery, thanks to the fantastic forms of its erupted rocks, towers, obelisks, temples, and the like. Above this range rise the true Mount Chalten and other active or extinct volcanoes, and to the same igneous system belongs the Cordillera de Latorre, with several conspicuous peaks—Tres Sabios ("Three Sages"), Philippi, Gay, Domeyko—and with one crater apparently of quite recent origin.

On the surface of the region sloping in the direction of the Atlantic there stretches a great sheet of scoriæ and other erupted matter, which is pierced at intervals by old volcanic cones, some isolated, some developing continuous chains. Here the estuary of the Santa Cruz River is indicated from a distance by the conspicuous landmark of Mount Leon, a limestone crag about 1,000 feet high. This solitary eminence is pierced by caverns, the resort of pumas, while the condor builds its nest on its rocky ledges.

South of the Andes proper, the coast is indented by a thousand inlets of all kinds, and here the summits assume an insular aspect, thanks to the surrounding bays, straits and lakes. Between Skyring Water and the great bend of Magellan Strait, the orographic system is reduced to a single ridge only a few yards high. But it again rises in the imposing headland of Cape Froward, and, on the other side of the strait, in the superb Mounts Sarmiento, Darwin, and Français, with their girdle of glaciers. Farther on the system develops a vast curve in the direction from west to east, terminating in Staten Island with summits some 3,000 feet high. This Argentine island forms the terminal rock in the long semi-circular range of the Andean Mountains, which begin with the island of Trinidad in the Caribbean Sea.

Staten Island, the Dutch Staatenland, and the Spanish Sierra de los Estados, faces the south-eastern extremity of Fuegia, from which it is separated by Le Maire strait, averaging from 15 to 18 miles in width. It extends a distance of 44 miles in the direction from south-west to north-east; but its shores are so indented with bays and inlets that it is nowhere more than 12 miles wide, the mean being somewhat less than 5 miles. To the gaze of passing seafarers the whole land, which has an area of about 200 square miles, presents nothing but a chaos of cliffs and sharp peaks clad with a perpetual snowy mantle. It terminates westwards in Cape Barthelemy and South Cape, whose projecting headlands enclose Franklin Bay. On the north side are developed the spacious Flinders Bay, and the two ports Hopner and Parry, which are followed eastwards by two other deep fiord-like inlets, Port Cook and Havre Saint-Jean, near Cape St. Jean, the terminal headland towards the east. On the south side are Blossom

Bay, Port Vancouver and, near the Dampier islets, the spacious York Bay about midway between the east and west points.

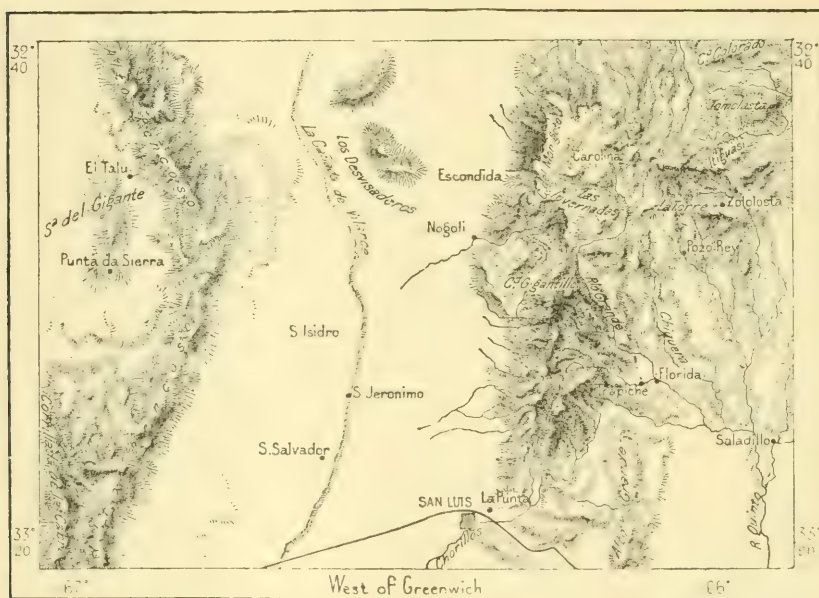
Staten Island, which was discovered in 1616 by the Dutch expedition of Le Maire and Schouten, was never occupied by any European power, and is, in fact, uninhabitable. At least, no permanent settlements could be advantageously formed in such an inhospitable region. At presents it depends politically on the Argentine Government of Tierra del Fuego.

RIOJA, SAN LUIS, AND CORDOBA UPLANDS.

Other mountain masses, at present separated from the Andes, but which probably at one time formed part of the system, are found scattered in isolated

Fig. 148.—SIERRA DE SAN LUIS.

Scale 1 : 1,000,000.



groups over the boundless plains of Argentina. A first group, the Sierra de los Llanos, rises above the saline and arid low-lying tracts midway between the Rioja and San Luis. This much-weathered sierra presents no distinct peaks rising boldly above its long rounded crests of crystalline and metamorphic formations, which scarcely anywhere rise much above 3,000 feet.

Farther north the Sierra Brava, which falls even below 3,000 feet, presents an analogous aspect, and doubtless belongs to the same orographic system—a mere islet, like the Sierra de los Llanos, in the ancient inland sea.

The Central system, which extends for a distance of over 300 miles, parallel with the great Cordillera, consists of several distinct chains, all disposed in the

same normal direction, and all standing on the same pedestal 1,500 feet above the plains. In general these crystalline mountains present, like the Andes, their steep face towards the west, and slope gently eastwards down to the pampas.

A first ridge, traversed by the streams descending from the central system, generally falls below 3,000 feet except at a few rare points, and culminates in the Cumbre de la Cal (5,150 feet) north-west of Cordoba. But the central chain attains in the Champaqui peak a height of over 7,550 feet. In the north-west the system merges in a plateau crossed by a line of volcanoes running east and west, and terminating abruptly in the trachytic Cerro de Yerba Buena, which rises 5,400 feet above the western plains. It has no apparent crater, nor has it emitted lavas or vapours in the memory of man; but slight earthquakes are occasionally felt in the neighbourhood, and underground rumblings are also said to be heard at the foot of these mountains.

The Sierra de San Luiz, or de la Punta, from its south-western spur, may be regarded as forming part of the Central or Cordoba system, which dies out northwards in the saline depressions. On their western and northern sides the San Luis heights present the aspect of bold mountain masses; but these escarpments merely serve to mask a hummocky plateau, which in many places assumes the character of a simple tableland. Amongst the highest peaks of the escarpments are Monigote (6,430 feet), and the Gigantillo, "Little Giant," which faces the Gigante, "Giant," of the Andes system on the opposite side of the deep Cañada depression.

The gneiss rocks of this sierra are distinguished from those of the Cordoba system by their extreme richness in quartz and mica. East of Monigote a short chain of volcanic heights, disposed transversely to the longitudinal axis, rises in the Tomolasta to an altitude of 6,850 feet, culminating point of the plateau and of the whole group. From its auriferous deposits this mountain has received the name of Cerro de las Minas.

THE TANDIL AND VENTANA HEIGHTS.

Between the Parana and the Uruguay the surface is broken only by slight rising grounds, or by fluvial cliffs; but in the territory of the Missions, which stretches eastwards into the Brazilian State of Santa Catharina, the campos plains are traversed by a ridge with crests of from 1,000 to 1,300 feet.

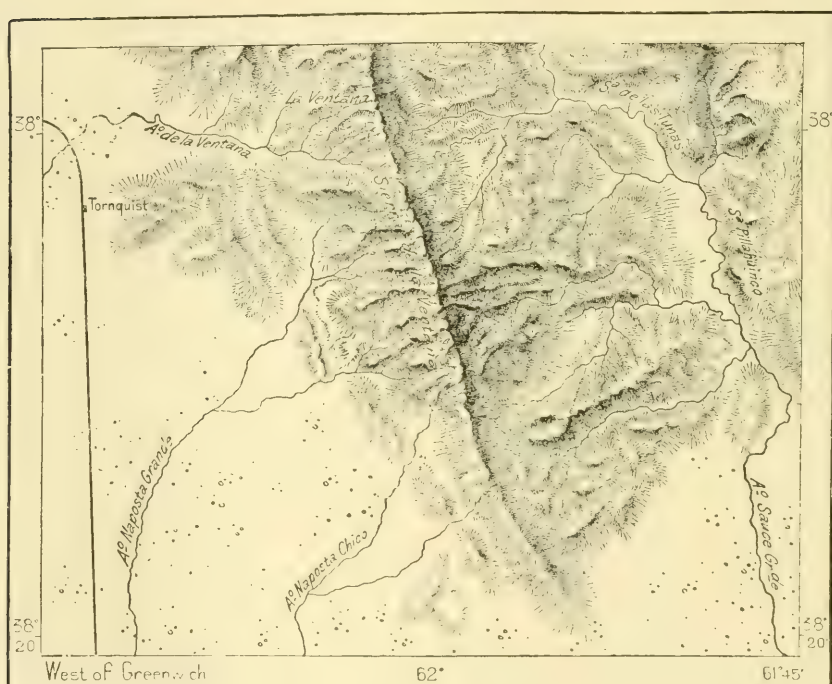
Distinct chains also rise east of the Patagonian Andes in the province of Buenos Ayres and in the southern territories. A first line of crests runs north-west and south-east parallel with the Lower Parana, terminating at the headland of Cape Corrientes. In the Sierra de Tandil this system rises to a height of 1,100 feet, and farther on in the direction of the south-east the Sierra del Vulcan has an altitude of 930 feet. Like the other heights of the surrounding region the Sierra del Vulcan consists of granites, gneiss, and archaic rocks. But there are no recent lavas, as might be supposed from the name of the range. But this term "Vulcan" is not a Spanish, but a local Indian word, which would

appear to have the meaning of *breach* or *gap*, in reference to the broad opening that occurs between the Sierra del Vulcan and the Sierra de Tandil.

Farther south the various groups rising north of Bahia Blanca, and commonly called the Ventana Mountains, comprise several parallel ridges disposed in a direction parallel to that of Tandil. In the Ventana range proper the highest summits exceed 3,800 feet; but they would appear to have formerly attained a far greater elevation. Consisting of whitish quartzites, in many places streaked with red ferruginous oxides, these mountains date from the oldest geological epochs. They existed long before the appearance of the Andes, and were probably at one time

Fig. 149.—SOUTHERN POINT OF LA VENTANA.

Scale 1 : 550,000.



amongst the loftiest highlands on the Southern Continent. They are, therefore, to be regarded as mere fragments of enormous masses which have been almost entirely disintegrated by weathering. The valley of the little Rio Sauce Grande, which flows between the Ventana and the Pillahuinco ranges, was formerly a glacial stream. Even still the Ventana receives a little snow every winter. Its name, meaning "Window," has reference to an opening near the summit, through which a peep may be had of the blue sky. The slopes of the sierra are nowhere thickly wooded, and in many places appear quite bare and destitute of all vegetation.

THE PATAGONIAN STEPPE LANDS.

The interior of the Patagonian districts watered by the Rios Colorado and Negro bristles with rocky crests, pink porphyries, and granites, which look in the morning sun like lightly-tinted vapours. These various groups, known by the general name of *mahuida*, that is, "mountains" in the native language, have an average height of from 1,300 to 1,650 feet, and are nearly all disposed north-west and south-east, like the chains of hills between Buenos Ayres and Bahia Blanca.

Between the ridges the ground is strewn with rolled pebbles, granites, gneiss, porphyries disposed in horizontal layers alternating with the dunes. These beds of rolled gravels cover all the tertiary plains which constitute the whole of the Patagonian plateau east of the Andes, and which contain a superabundance of fossil remains. This prodigious mass of Patagonian gravels was calculated by Darwin to extend for about 600 miles north and south, with a mean breadth of 200 miles, and a depth of 50 feet. Whole mountain ranges must have been triturated to yield such gravel beds as these; and to the Patagonian deposits must be added the detritus of like nature at present covering the marine bed itself. Such are the rolled porphyries which the soundings have fished up in the waters of the Falkland Islands, far from any insular masses containing analogous rocks.

These pebbles are evidently derived from the Andes and the older mountains, which formerly rose above the central and eastern plains, and of which nothing now remains except the nuclei. Glacial moraines have undoubtedly supplied the raw material, which has been distributed by the marine waters in horizontal or very slightly inclined beds. Then followed the phenomenon of emersion, due either to an upheaval of the land, or to a subsidence of the sea. Thus the old shingly beach became the dry gravel pits of Patagonia, in which are found prodigious quantities of those gigantic oysters, 15 to 20 inches round, which are so widely diffused throughout the soil of Patagonia. Near Possession Bay, at the Atlantic entrance of Magellan Strait, de Pourtalès discovered a lagoon standing 160 feet above sea level, and containing shells absolutely identical with those of the neighbouring waters.

Hence there can be no reasonable doubt as to the general movement of upheaval along the Patagonian seaboard. But geologists have not yet determined its true character, and while some suppose that it took place in a succession of sudden upward thrusts, corresponding to the several raised terraces, others with more probability suggest that it was, on the contrary, a slow movement produced in a series of rhythmical undulations.

During the contemporary period other formations have been superimposed on the Patagonian gravel beds, and on the argillaceous clays of Central Argentina. Over vast spaces the ground is now covered with sands, which form dunes analogous to those developed on many coastlands under the influence of the winds setting from the high seas. But in the Platean regions these shifting dunes are not of marine origin; they are, on the contrary, derived from the region of foot-

hills, where have been accumulated prodigious quantities of débris from the moraines left by the old glaciers at the entrance of the plains.

The finer particles, raised by the winds in clouds of dust, are wafted to great distances and strewn over the surface in layers of sand analogous to the "yellow earth" of Central China. But the coarser sands form veritable dunes, "land waves," so to say, heaving and falling under the pressure of the aërial currents. In the region of the Colorado and Rio Negro especially these formations occupy vast spaces, stretching nearly across the whole width of the Continent. Acting in the same way as the dunes of oceanic origin, they are arrested under the influence of the rains, and resume their slow forward movement during the dry periods. They are often solidified and transformed to hills gradually covered with a vegetable humus by the binding action of plants with long trailing rootlets and branches. Certain species of trees with strong roots, such as the *algarrobos*, continue to thrive in the midst of the moving sands by which they have been overtaken.

The eruptive craters of the Andes also contribute to change the aspect of the Patagonian lands. The whole of the Rios Chubut and Santa Cruz basins have been covered with ashes of diverse colours, which are deposited in regular layers, and which are evidently erupted matter ejected by the volcanoes of the Cordilleras, and wafted to great distances by the western and north-western winds.

In 1886 a great shower of such volcanic dust rained over the whole of the Santa Cruz valley, on the surrounding heights, and even reached Punta Arenas. In some districts travellers found it difficult to breathe, and could scarcely discern objects ten yards off. Many animals perished for want of water and fodder, springs and pasturage having disappeared beneath the layer of ashes. For a time the Santa Cruz itself ceased to flow, and then suddenly rose to a great height, doubtless having burst the temporary dam formed by the volcanic débris. In 1893 the Chilean volcano, Calbuco, supposed to be extinct, ejected scorix as far as the mouth of the Chubut and Nuevo Bay. So rapidly had the clouds of ashes traversed the vast distance that they fell while still warm, covering the navigation as if with a mantle of snow.

Despite their generally dreary and monotonous aspect, the Patagonian steppe lands seem to produce a strange, fascinating impression on all observers. "In calling up the images of the past," writes Charles Darwin, "I find the plains of Patagonia frequently cross before my eyes; yet these plains are pronounced by all to be most wretched and useless. They are characterized only by negative possessions; without habitations, without water, without trees, without mountains, they support only a few dwarf plants. Why then—and the case is not peculiar to myself—have these arid wastes taken so firm possession of my mind? Why have not the still more level, the greener, and more fertile pampas, which are serviceable to mankind, produced an equal impression?"

"I can scarcely analyse these feelings, but it must be partly owing to the free scope given to the imagination. The plains of Patagonia are boundless, for they are scarcely practicable, and hence unknown. They bear the stamp of having

lasted for ages, and there appears no limit to their duration through future time. If, as the ancients supposed, the flat earth was surrounded by an impassable breadth of water, or by deserts heated to an intolerable excess, who would not look at these last boundaries to man's knowledge with deep but ill-defined sensations?" *

Since Darwin's time, however, "these desolate regions have ceased to be impracticable, and although still uninhabited and uninhabitable, except to a few nomads, they are no longer unknown. During the last twenty years the country has been crossed in various directions, from the Atlantic to the Andes, and from the Rio Negro to the Straits of Magellan, and has been found all barren. The mysterious illusive city, peopled by whites, which was long believed to exist in the unknown interior, in a valley called Trapalanda, is to moderns a myth, a mirage of the mind, as little to the traveller's imagination as the glittering capital of Great Manoa, which Alonzo Pizarro and his false friend, Orellana, failed to discover. The traveller of to-day expects to see nothing more exciting than a solitary huanaco keeping watch on a hill-top, and a few grey-plumaged rheas flying from him, and possibly a band of long-haired roving savages, with their faces painted black and red.

"Yet, in spite of accurate knowledge, the old charm still exists in all its freshness; and after all the discomforts and sufferings endured in a desert cursed with eternal barrenness, the returned traveller finds in after years that it still keeps its hold on him, that it shines brighter in memory and is dearer to him than any other region he may have visited. In Patagonia the monotony of the plains, or expanse of low hills, the universal unrelieved greyness of everything, and the absence of animal forms and objects new to the eye, leave the mind open and free to receive an impression of visible nature as a whole. One gazes on the prospect as on the sea, for it stretches away, sea-like, without change, into infinitude; but without the sparkle of water, the changes of hue which shadows and sunlight and nearness and distance give, and motions of waves and white flashes of foam. It has a look of antiquity, of desolation, of eternal peace, of a desert that has been a desert from of old, and will continue a desert for ever." †

THE PAMPAS.

Absolutely level plains occur only in Argentina proper north of the Rio Colorado. These horizontal spaces stand at different heights above the Plate estuary, and also present other contrasts due to the varying nature of soil and climate. The northern region, comprised between the foothills and the course of the Paraguay-Parana, constitutes the so-called Chaco (Gran Chaco), which owes its peculiar aspect to its vegetation of thorny scrub, palm groves, and open or leafy woodlands.

Other inland plains, lying farther south on both sides of the Cordoba heights,

* *Voyage of the Beagle.*

† *Idle Days in Patagonia.*

are, on the contrary, completely bare, and studded with saline basins glittering in the solar rays. Lastly, the savannas, which stretch from the Cordoba uplands to the lower Parana, and from the Plate estuary to the Patagonian foothills, take the name of *pampas*, a Quichua word applied on the Peruvian and Bolivian plateaux to level spaces, terraces, or bottom lands. Farther south, in Patagonia proper, the grassy pampas gradually merge in a stony steppe covered with scrub or bush.

Of all the Argentine regions the pampas have been most frequently described, because they begin on the very outskirts of the large cities—Buenos Ayres, Rosario, Santa Fé—and have thus to be traversed to reach the provinces of the Far West. They are not uniformly level, as might be supposed, but consist, in reality, of a gently inclined terrace falling from 3,000 to 600 or 700 feet between the foot of the Cordoba hills and the Rio Salado of Buenos Ayres, and a low-lying plain falling from 250 to 120 feet, which develops a semi-circular zone along the Parana and the Plate estuary, as far as the Atlantic.

The more elevated terrace constitutes the steppe proper, the central pampa, which always stands above the level of the great inundations, whereas the low-lying plain was formerly laid under water by the rivers in flood. This region must be regarded as an alluvial tract deposited by the broad moving sea of the Parana, and gradually dried by the layers of fine loess analogous to the yellow earth of China, strewn over the surface by the west winds. No stones are found intermingled with these upper beds of the pampas. The rocky foundation on which they rest consists of a very fine-grained sandstone of miocene origin, like the tertiary beds of Patagonia.

The general aspect of the pampas changes continually, not only with the seasons, but even with the time of day. Their appearance at sunrise in the summer months is pictured by Rumbold as indescribably beautiful. "No words can convey an adequate idea of the beauty and freshness of the prairie at this early hour. The young sun, but just risen like ourselves, floods the low and perfectly level horizon with a flush of pink and yellow light. At once you realise the full force of the well-known hackneyed image which compares the boundless expanse of plain to an ocean solitude, for the effect is truly that of sunrise out upon the face of the waste of waters. The fiery disc emerges out of what seems a sea of verdure, all burned and brown though everything be in reality, and in its slanting rays the tip of each blade of grass, the giant thistles with their rose-purple crowns, the graceful floss-like panicles of the pampa grass (*paja cortadera*), just touched by the breeze and all glittering with dew, undulate before the eye, like the successive sparkling lines that mark the lazy roll of the deep in the dawn of a tropical calm.

"The sky above, of a most lovely pale azure and of wonderful transparency, has not yet deepened into that almost painful hue of crude cobalt it acquires in the full blaze of noontide. In the west the vapours of night have not entirely rolled away, while down in the dips and depressions of the ground—*cañadas*, as they call them here—and over the reed-fenced *lagunas*, a thin blue mist

still lingers and mingles deliciously with the various subdued tints of brown and green around.

"This tender tonality lasts but a very short time, the sun shooting upwards with a speed and force that at once completely transforms the picture; the scorching agencies of light revealing it in its true parched colours and reducing it to a burning arch above, and a scorching and featureless flat below. The fresh, rippling ocean turns into a weary wilderness, staring up at a breathless, pitiless sky." *

Nor are the pampas regions so destitute of animal life and motion as is commonly supposed. The same observer speaks of the stir of bird and insect life that accompanies the waking up of the great plain at dawn. "The air is full of buzzing and chirping and of the flutter of wings. So thickly is the pampa peopled with birds that it quite produces the effect of an open-air aviary. Brilliant little creatures with red or yellow breasts, *zorzals* and cardinals, magpies and oven-birds dart in and out of the grass and bushes in every direction, while in the higher regions numerous hawks and kites hover ominously over these tempting preserves.

"All the feathered tribe are singularly fearless and unconcerned at one's approach, the only exception being the well-known abomination of the sportsman in the pampa, the spur-winged plover. This insufferable creature, who, 'as Darwin somewhere says of him, appears to hate mankind, swarms all over the prairie, and pursues one with a loud and discordant cry, which is exactly rendered by his common name of *teru-tero*. He is really a very handsome bird, with glossy black and lavender plumage tipped with green and purple, but, like much lovelier beings one has occasionally met with, his beauty is quite marred by his harsh, unmusical voice and forward ways. He is both the spy and the scold of the pampa. Being too worthless in himself to stand in danger of being shot, his one idea seems to be to spoil sport. As soon as he gets sight of you, he sets up his shrill wearying note and follows you pertinaciously about, of course warning all the game around of your approach." †

A still greater pest is the *bicho colorado*, a villainous little bright red insect, no bigger than a pin's head, whose bite causes an intolerable irritation, which lasts for days together. But with the exception of these plaguy little creatures and of the clouds of mosquitoes swarming about all the lagoons, the pampas regions are singularly free from noxious vermin of all kinds. The only really venomous animals appear to be the dreaded tarantula and the still more dreaded *ribora de la cruz*, a deadly species of viper.

On the other hand, game abounds to an extraordinary extent in some districts verging on the forest zone. Even in the "campo," as the steppe lands are called in the province of Buenos Ayres, some good shooting is still afforded by such aquatic birds as the swan, goose, flamingo, duck, grebe, and water-hen, besides deer, the Patagonian hare, snipe, and partridge. The partridge is somewhat

* *The Great Silver River*, p. 273.

† *The Great Silver River*, p. 275.

larger than its English congener, but not to be compared to it in flavour, the flesh being white and rather tasteless.

Most of the land about Buenos Ayres consists of an extremely rich alluvium, where the alfalfa clover and some other herbaceous plants grow with amazing rapidity. In some districts Dr. Edgcumbe speaks of five crops of clover being raised in a single year.* Wheat also thrives well, and yields excellent returns.

HYDROGRAPHY OF ARGENTINA.

The La Plata fluvial system, next to that of the Amazons the largest in the New World, belongs at once to Bolivia, Brazil, Paraguay, Uruguay, and to the Republic which, from the estuary, takes its names of La Plata and Argentina. This State comprises about one half of the whole basin, although by far the largest part of the liquid mass is supplied by the conterminous territories. At the confluence of the two great rivers, Paraguay and Parana, where the united waters enter a region belonging entirely to Argentina, the discharge is actually greater than at the head of the estuary. Below the confluence the contributions of the feeble Argentine affluents are insufficient to make good the loss by evaporation.

THE RIO BERMEJO.

At the Tres Bocas, name of the inland delta formed about the confluence, the Rio Bermejo (Vermejo, "Red"), largest of the Argentine tributaries, has already joined the Paraguay branch. This river, which flows parallel to the Pilcomayo farther north, has its source in the Andes, east of the Jujuy plateau. One of its main branches, the Bermejo proper, is joined below Oran by the San Francisco, a stream of equal volume, which collects the surface waters of the province of Jujuy. Above the confluence—Las Juntas, as the Spaniards call it—both branches are alike navigable; but farther down so many difficulties, and even dangers, are presented by shoals, quicksands, and armed natives, that no regular service has yet been established on the lower reaches. The flat-bottomed boats, which carry on a little trade, take whole months to ascend and descend the Bermejo, and cannot pretend to compete with the railway, which now penetrates from Buenos Ayres into the Jujuy district.

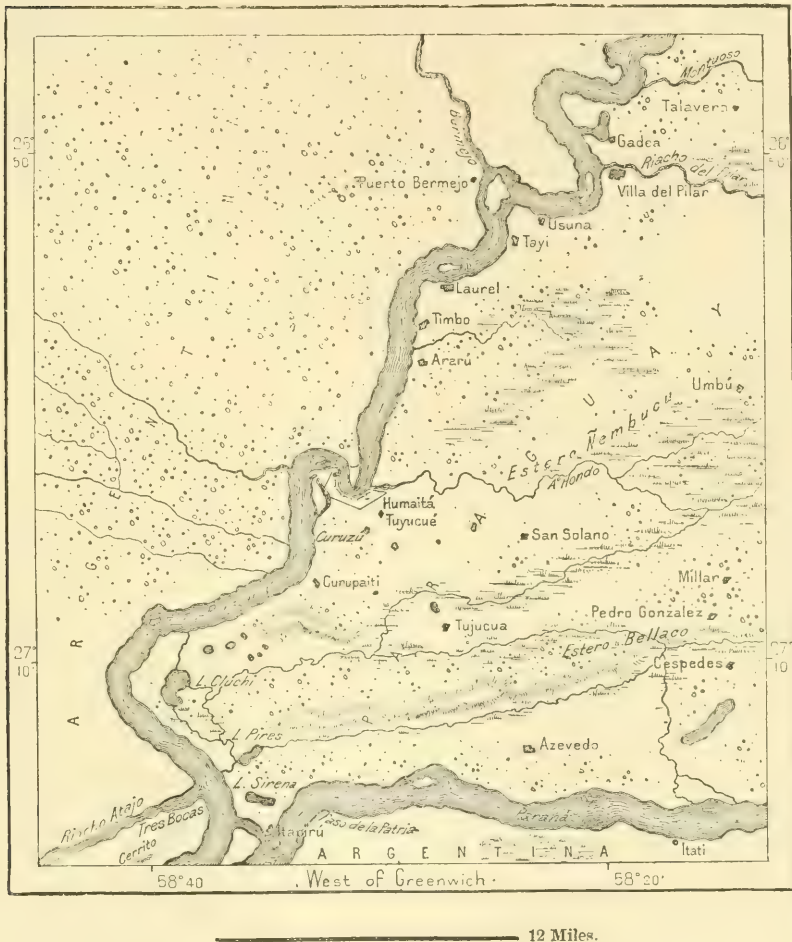
In the region of its lower course the incline is so slight that the sluggish current of the Bermejo ramifies right and left into numerous lateral branches and shallow basins, where much of the water is lost by evaporation. Nearly all the old forests have disappeared, killed by the superabundance of flood waters. About the middle of the nineteenth century the Bermejo shifted its bed some twelve miles northwards to the parallel Rio Teuco or Teuchtach, and since then the lateral inundations have diminished on both sides, the stagnant backwaters have been gradually filled by alluvial matter, and the old bed of the Bermejo is now

* *Zephyrus*, p. 196.

nearly dry, except in the lower reaches, which have become brackish. It takes its name from the reddish colour of the stream, which throughout its lower course is obstructed at intervals by banks of a white clay, like those of the Pilcomayo, which it so greatly resembles in its general régime. Including the windings it

Fig. 150.—TRES BOCAS IN 1860.

Scale 1 : 500,000



has a total length of over 1,300 miles, of which nearly 850 are navigable for six months in the year.

THE RIO DEL JURAMENTO.

The Rio del Juramento has its farthest sources in the Nevados of Cachi, west of the Salta uplands. Forcing its way in abrupt windings through the barrier of the sierras, it is known by various names along its irregular upper course, first Guachipas, then Rio del Pasaje at the point where it is crossed by the highway

between Tucuman and Salta, and farther down Juramento, or "Oath," in memory of the solemn vow taken by Belgrano's army on its march to Peru to achieve the independence of the American natives.

On issuing from the mountains the Juramento traverses Gran Chaco first in a southerly direction, and then from north-west to south-east. But here it flows with a scarcely perceptible current, and under the latitude of Tucuman, expands into *bañadas*, half-flooded morasses and fluvial channels, with uncertain flow and half choked by aquatic plants. Beyond Santiago del Estero where the sluggish waters converge in a single channel, it again spreads out in shallow basins, which during the inundations overflow far and wide along both banks.

At this period the water is fresh; but during the dry season it becomes slightly saline, so that the lower course takes the name of Rio Salado, "Salt River." The surveys made by Page with the *Water Witch* in 1855, and since then by many others, clearly show that the Juramento is navigable wherever it flows in a single continuous stream, and that it would be easy to cut a canal through the *bañadas*. But the settlers prefer forwarding their produce by the railway crossing the plain from Rosario directly to Tucuman.

THE RIO DULCE.—MAR CHIQUITA.

With one exception all the pampas rivers south of the Rio Juramento fail to reach the Parana, although the direction of their valleys shows that they belong to that basin, and were, in fact, formerly perennial affluents of that watercourse. Such is the Rio Dulce, which flows from the Salta uplands in a southerly direction, and after receiving on its right bank numerous torrents from the Sierra d'Aconquija, describes a great bend south-eastwards round the Sierra de Guazayan, parallel with the Juramento. But north of the northern spurs of the Cordoba Mountains the Rio Dulce, already brackish, despite its name, begins to ramify and wander aimlessly over the almost uninhabited plains, where at least six channels have been traced, which are still flooded during the inundations. Before 1825, the eastern or main branch watered the plantations of Loreto, Atamisqui, and Salavina; but it was deflected by some obstruction westwards to the chain of Saladillo lagoons, which are so saturated with salt that the water is as buoyant as that of the Dead Sea, or of Lake Urmiah.

There can be no doubt that the vast saline depressions stretching south-westwards between the Sierras de Cordoba and de los Llanos formerly received the waters of the Rio Dulce; but at present the Saladillo is rejected eastwards to the channel occupied before 1825, beyond which it gradually runs out in the Porongos marsh or lagoon. This basin terminates southwards in a real lake, the Mar Chiquita, "Little Sea," which shifts its contour lines according to the quantity of water discharged by its affluent. Its bed, formed of a hard clay, is flooded in some places to a depth of 110 feet.

THE RIOS PRIMERO, SEGUNDO, TERCERO, CUARTO, AND QUINTO.

The streams descending from the Cordoba heights eastwards to the pampas, have been numbered rather than named in their order from north to south. The Rio Primero, "First," transformed by a reservoir to a lake above Cordoba, almost runs dry on entering the pampa, although after heavy rains its yellowish waters reach the Mar Chiquita. The Rio Segundo, "Second," which follows a parallel course farther south, also disappears in shallow depressions, which evaporate in the sun.

But the more copious Rio Tercero, "Third," maintains its current across the pampa, although gradually changing from a fresh water to a saline stream. Towards the middle of its course it receives the salt water of the Saladillo, which appears to be fed by the infiltrations from the irrigation canals derived from the Rio Cuarto, "Fourth." Before reaching the Parana, the Tercero, here called the Carcaraña, or Carcarañal, from an extinct Guaraní tribe met by Cabot, is joined by the Arroyo de las Tortugas, "Turtle Creek," which was perhaps at one time the outlet of the Mar Chiquita. The Carcaraña is accessible only to boats drawing two or three feet.

The Rio Quinto, "Fifth," rises not in the Cordoba uplands, but farther west in the Sierra de San Luis, and the streams descending from the Cordoba slopes fail to reach its banks. After a south-easterly course of 300 miles it runs out in the Amarga, or "Bitter" lagoon, in a region of swamps and quagmires extremely dangerous to wayfarers. These *guadales*, as they are called, long afforded a refuge to the Ranquele Indians against the white invaders.

EASTERN AFFLUENTS OF THE PARANA.—LAKE IBERA.

On its left bank the Parana receives the contributions only of a few small affluents. In this Argentine "Mesopotamia," the surface is also so level that the waters expand in swamps and lagoons, such as the Lake Ibera, "Brightwater," which, perhaps, indicates the former channel of the Parana, when it flowed parallel with the Uruguay.

In this part of the region comprised between the two main streams the surface stands almost at a dead level. Hence it was found possible to attempt to partly drain the Ibera lagoon at two different points. At the head of the basin trenches were excavated for the purpose of carrying off the overflow to the upper Parana, while lower down the rivers Batel and Corrientes were deepened and canalised, and thus made to receive a portion of the discharge through some sluggish channels. The Ibera lagoon has a total length of over 24 miles, with flat uncertain margin on the west side, but sharply limited on the east side by steep banks and hillocks, which rise to heights of from 30 to 50 feet above the surface of the lake. The whole basin is disposed in a succession of *esteros*, most of which are overgrown with forests of reeds, while others are deep enough to be navigated by small craft. But few boatmen venture to ply on these waters, which are

infested by prodigious clouds of midges. These lagoons of the Corrientes region are reported to have encroached, in recent years, on the surrounding lands.

South of the Rio Corrientes, which partly drains Ibera, follow a few other tributaries, which, however, are insufficient to compensate for the loss by evaporation. The Gualeguay, largest of these tributaries in the province of Entre-Rios, winds in a sluggish course of about 250 miles parallel with the lower Uruguay. It discharges, not into the Parana direct, but into the Pavon, one of those lateral channels which are alternately flushed and abandoned by the main stream.

Between the Tres Bocas and Plate deltas, the Parana is increased in width tenfold by numerous other affluents winding through the vast fluvial depression. Even those pampa streams, which at present lie quite beyond the labyrinth of Parana waters, formerly belonged to the system. Such are in the province of Santa Fé, the Saladillo Dulce and the Saladillo Amargo, "Sweet" and "Bitter" Saladillo, both of which have a course of about 250 miles.

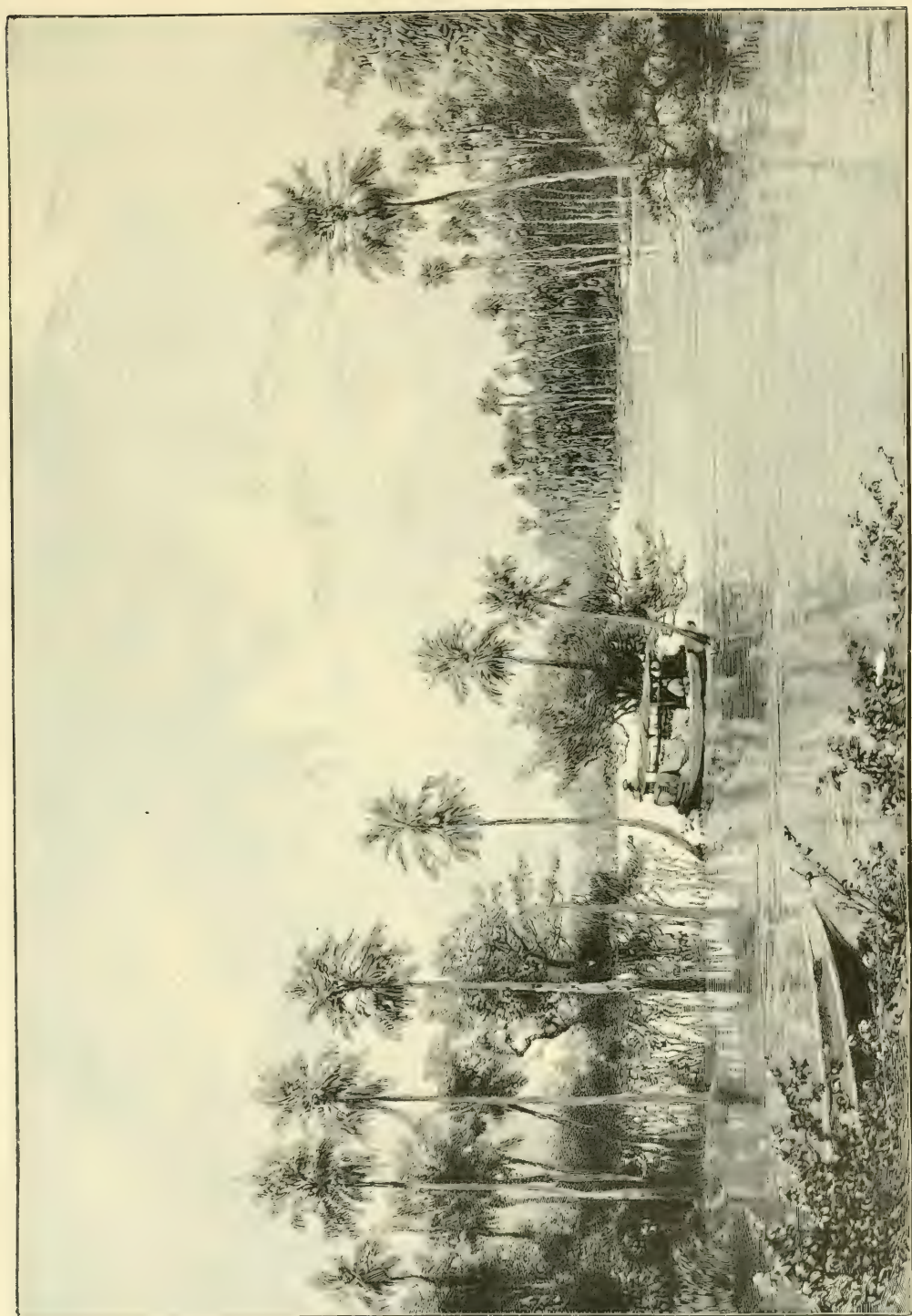
THE PARANA DELTA.

The Parana delta, properly so-called, begins below the Diamante bluff, at the point where the river trends round to the south-east in the direction of the Plate estuary. This point marks the former head of the marine gulf at a time when it penetrated 370 miles into the interior of the Continent. All the upper part of this vast inlet has been silted up by the alluvial deposits for a distance of 230 miles, and the elongated islands occupying the wide zone of unstable ground between the lateral cliffs have all been formed by these siltings.

In this vast deltaic region the main channel of the Parana hugs the right (pampa) bank nearly to the town of San Pedro, where nearly the whole fluvial mass is collected in a single channel, which contracts at one point to less than 700 yards, with a depth of about 160 feet. The lateral channels skirting the shores of Entre-Rios take various names, such as Victoria, Paranaquito, Pavon, Ibicuy. But during great inundations, such as those of 1858 and 1868, all are merged in a single sheet of water flooding the whole of the ancient marine inlet, and even submerging the intervening islands. At such time steamers ply between Victoria and Rosario, right across the temporarily restored estuary, which is here nearly 40 miles wide.

Below San Pedro the Parana Guazu, "Great Parana," crosses from the western to the eastern (Entre-Rios) side, throwing off in the direction of Buenos Ayres the Baradero, a small branch, which is usually followed by light craft to avoid the winds and swell of the main channel. Another branch, the Rio de las Palmas bifurcates from the Parana Guazu, and although less copious, maintains a uniform width all the way to the estuary, whereas the Guazu ramifies into numerous lateral creeks, some of which even trend north and north-east to the Uruguay.

The chief mouth, about 880 yards wide, opens north of the delta, not in a line with the axis of the Plate estuary, but more to the north in that part of the inlet where the Uruguay debouches just below the Higuerites Strait. The front

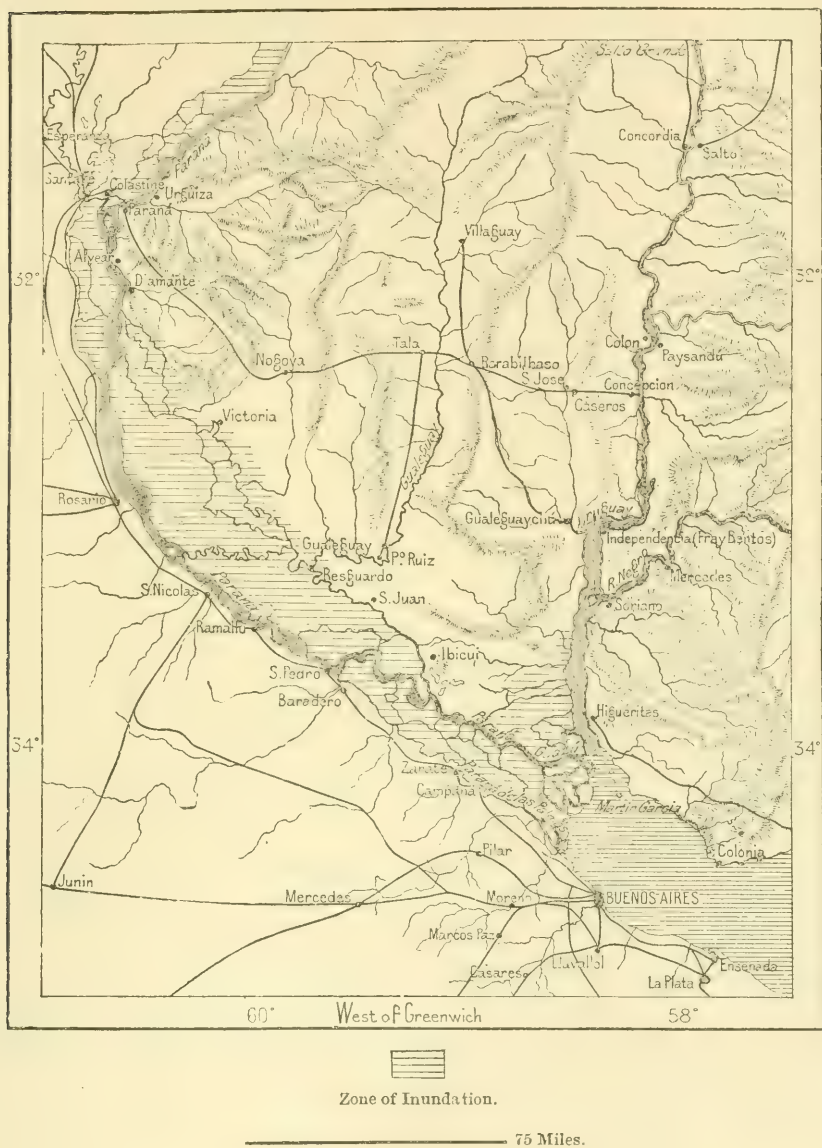


LAS PALMAS LAGUNES, NEAR THE MOUTH OF THE PILCOMAYO.

of the delta on both rivers develops a total length of 38 miles in a bee line, and in 1860 was intersected by eleven branches. But the number of these fluvial

Fig. 151.—PARANA-URUGUAY DELTA.

Scale 1 : 3,500,000.



mouths varies with the discharge and with the progress of the delta down the estuary.

Both in the Parana and the Uruguay the tides ascend to a distance of over 90 miles. But at low water the two rivers present a great contrast, for the Parana still remains a great and majestic stream, with a volume even at its lowest level

equal to the average discharge of the Mississippi, and from thirty to forty times greater than that of the Seine at Rouen. But the Uruguay shows great deviations, being nearly equal to the Parana when in flood, whereas during the dry season it is reduced to quite a secondary stream with not more than one sixtieth part of its volume at high water.* Such oscillations in the volume of its waters are explained by the uniform character of the climate in the region traversed by the Upper and Middle Uruguay, and by the lack of lateral reservoirs, by which the discharge might be regulated.

To the volume of water contained in the beds of the Parana and Uruguay must be added the subterranean channels, which flow with a sluggish current below the surface, and which are also due to the rains that fall in the fluvial basin. Below the upper layers there stretches a bed of saturated sands intermingled with a sheet of fresh water, and containing small fluviatile shells. This underground basin, which has been discovered by soundings in the sub-soil of Buenos Ayres at a depth of at least 75 or 80 feet, is in direct communication with the section of the Parana between Rosario and San Pedro. It is replenished not only by direct contributions from the main stream, but also by continuous underground infiltrations; hence it may be regarded as practically inexhaustible.†

THE PLATE ESTUARY.

The visible Parana-Uruguay delta is continued by a submarine delta, which must gradually rise above the surface, if the relative levels of land and sea are maintained in these waters. Sandbanks separated by deep troughs are advancing beyond the alluvial islands, and slowly connecting Martin Garcia with the mainland. The fluvial sediment, which has already absorbed so much of the old marine inlet, is steadily encroaching on the Plate estuary.

Both the Parana and the Uruguay are ceaselessly washing down alluvial matter, which is deposited in sandbanks, and which at low water transforms the whole estuary to a labyrinth of channels, where the shipping has already to thread its way cautiously. The mean depth of the estuary measured between Monte Video and Punta de las Piedras, is only 13 or 14 feet, and it must have greatly diminished even within a comparatively recent geological epoch, for large whales were formerly stranded above Buenos Ayres, where the water is now too shallow to give them access. Before the recent dredgings and other harbour works, all vessels had to ride at anchor far from the shore, passengers and goods being landed in flat-bottomed barges, and during fine weather in carts drawn

* Comparative table of the Parana and Uruguay, according to Aguirre, Revy, and Bateman:—

	PARANA.	URUGUAY.
Extent of catchment basin . . .	1,150,000 sq. miles	155,000 sq. miles
Extreme length	2,900 miles	920 miles
Minimum discharge per second . .	73,000 cubic feet	19,500 cubic feet
Mean " "	393,000 " "	141,000 " "
Maximum " "	1,650,000 " "	495,000 " "
Proportion of sediment in both rivers:— $\frac{1}{10000}$.		

† Emilio Godoy, *Boletín del Instituto Geográfico Argentino*, Vol. V., 1884.

over the hard bed of the estuary through the water reaching up to their axles. The superficial area of the estuary proper, which at the entrance is 60 miles wide, is estimated at about 5,000 square miles.

Still more extensive is the outer gulf, which is limited on the north side by Cape Maldonado, and on the south by Cape San Antonio. From the observations on the marine temperature made by the *Gazelle*, it would appear that the Platean

Fig. 152.—ARGENTINE SCENERY.—VIEW TAKEN OPPOSITE THE COLLON-CURA.



waters penetrate in the direction of the south as far as Cape Corrientes. Here they merge in two other liquid masses, one coming from the tropical regions, the other setting from the Pacific Ocean round Cape Horn.

Despite buoys and lighthouses, the funnel-shaped Plate Estuary continues to be extremely dangerous to shipping. The short, chopping seas charged with sands, the swift and shifting currents, the fierce squalls succeeding each other at

sudden intervals, greatly imperil the navigation; even large vessels often drag their anchors, break from their moorings, and run aground on the sandbanks, or on some of the islands in process of formation.

THE CLOSED BASINS OF ARGENTINA.

Between the Juramento-Salado and the Rio Colorado on the Patagonian frontier, none of the rivers rising between the eastern slopes of the Andes and the Sierra de Cordoba reach the Atlantic through the Plate estuary. The closed basins, which are comprised within this north-western region of Argentina, and which are nearly all disposed in the direction from north to south parallel with the Cordillera itself, appear to be of glacial origin. Their beds are strewn with angular boulders, which have not been transported to any great distances, but which have been slightly worn by the action of winds and sands.

Within a recent geological period all the running waters descending from the Andes west and south of Aconquija heights must have reached the Atlantic through the Colorado, whose basin was formerly far more extensive than at present. The northernmost streams of this now half-dried basin are all now reduced to small dimensions. Thus the Chaschuil, with its Fiambala branch and other affluents, shrinks to half its size in a saline sandy depression of lacustrine origin, beyond which it penetrates through a defile into the plains of the Rio Rioja, where its current is completely exhausted. From this point to the junction with the San Juan the distance in a straight line is about 280 miles from north to south.

The Rio Vermejo (de la Rioja) and the Jachal, which descend to the west of the Famatina heights, also receive lateral contributions from the snowy Cordillera, by which their current is maintained for a greater distance than that of the eastern rivers. But owing to the irrigation canals derived from both banks they do not always reach their confluence. Hence their lower course, the Rio Zanjón, alternately increases and decreases with the seasons, without ever reaching the marshy basin in which it might effect a junction with the San Juan.

This latter watercourse, with its widely ramifying headwaters, issues as a foaming torrent from the mountains, but is immediately captured by numerous irrigation rills winding in all directions over the plains. Nevertheless, sufficient water remains in the main channel to form a little navigable stream, which is joined lower down by the drainage of the irrigated lands, and which discharges into the marshy Huanacache lagoons. The same depression also receives the Rio de Mendoza descending from the Cumbre and fed by the snows of Aconcagua and Tupungato.

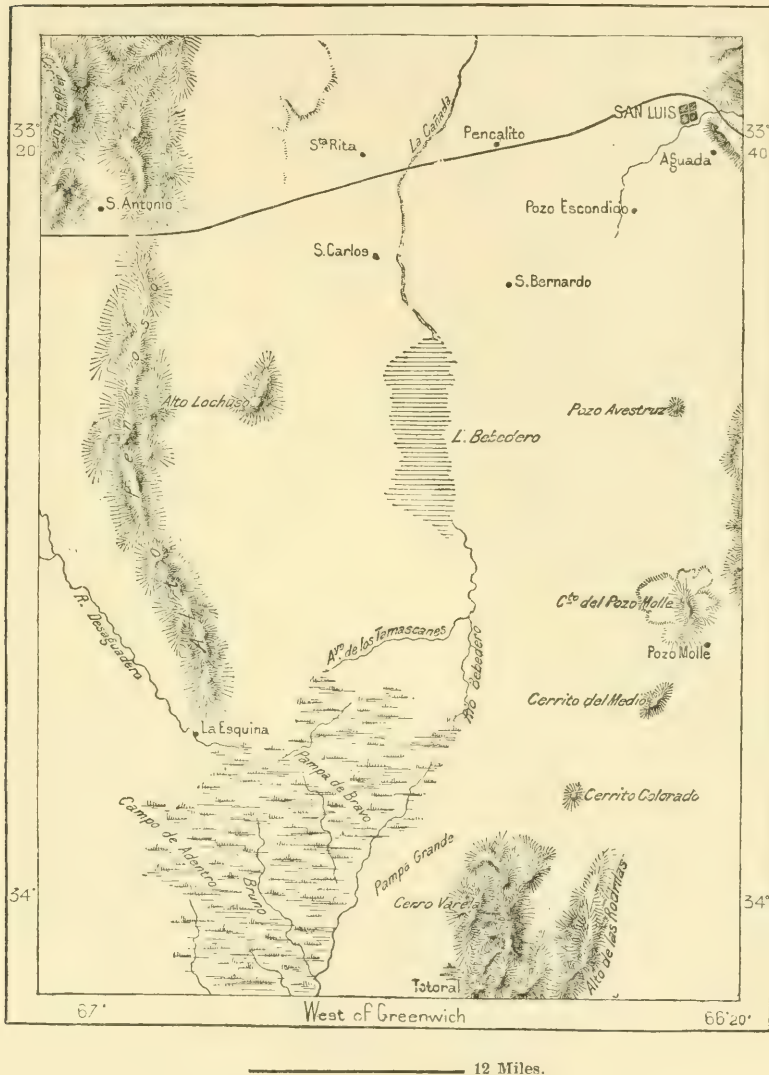
LAKE BEBEDERO.—RIOS SALADO AND ATUEL.

The overflow of these saline lagoons is carried off by the Desaguadero, which is nearly dry for a part of the year, and which flows south-east, throwing off a

lateral branch to Lake Bebedero. This basin, former recipient of a large northern affluent from Aconcagua, expands and shrinks with the seasons, at times a mere saline pool, at times overflowing far and wide into the surrounding *bañados*. In dry years the Bebedero deposits layers of salt around its margin, and it appears

Fig. 153.—RIOS BEBEDERO AND CAÑADA.

Scale 1: 700,000.



from other indications to be in process of desiccation. It will doubtless be ultimately transformed to a saline depression, like those situated farther north along the course of the *cañada* or channel of its former affluent from Aconcagua.

Beyond the Bebedero, that is, the "Drinker," in reference to the water-courses absorbed in its basin, a branch of the Desaguadero, swollen by the Rio

Tunuyan, continues to flow southwards. But the sluggish current is frequently dammed and even displaced by the shifting sands and high dunes drifting before the wind on these nearly horizontal plains. The river, which here takes the

Fig. 154.—ANCIENT BASIN OF THE COLORADO.

Scale 1 : 13,000,000.



fully justified name of Salado, wanders, so to say, under the action of the aërial currents.

The Diamante, one of its affluents, which is stated to be to some extent navigable, has also shifted its channel under the same influences. Formerly

it was a tributary to the Rio Atuel, which flows more to the south. But having been deflected eastwards by moving sandhills it now flows in the direction of the Salado. Thus is formed a large triangular space, whose sides are represented by the three rivers Diamante, Salado, and Atuel.

Below the last named, which descends from the snowy Cordilleras, the Salado, gradually losing in volume and rambling with uncertain flow over the level plains, is at last arrested by a chain of dunes. Here it expands into the broad but shallow Urre-Lafquen basin, called also Laguna Amarga, from its "bitter" waters, which, despite their saline character, abound in fish.

Beyond this basin the Cura-co, or channel, may still be distinguished through which the Salado formerly reached the Rio Colorado. It might almost seem as if the current had at one time been diverted from the Colorado eastwards to the broad estuary of Bahia Blanca on the Atlantic, which presents the aspect of a fluvial mouth, and which has the appearance of being connected with the Urre-Lafquen depression by a chain of lagoons, morasses, and dried lacustrine basins.

THE RIO COLORADO.

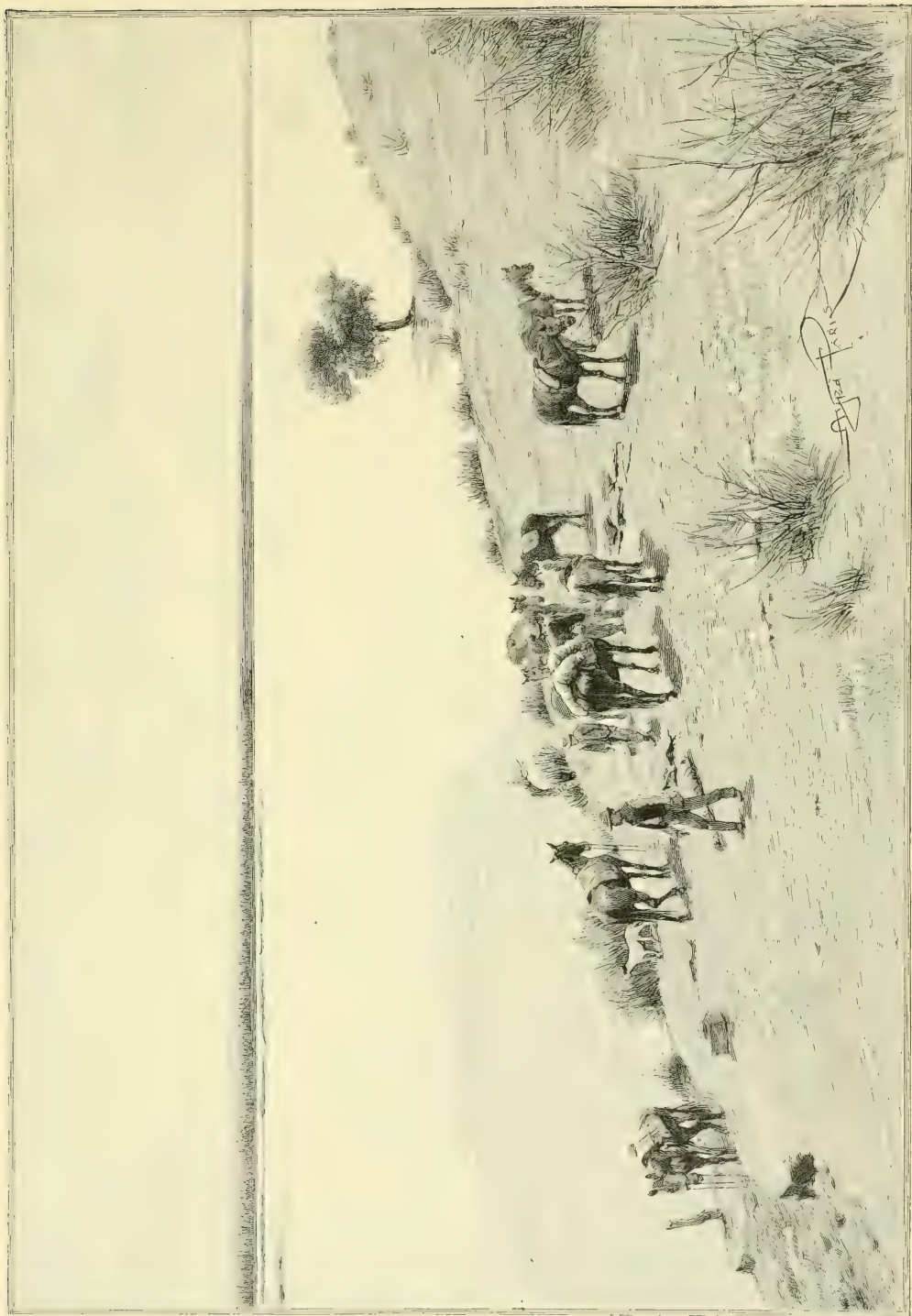
In any case the Colorado is now completely separated from the whole of its northern basin, which is seven or eight times more extensive than the region to which it is now confined. Beyond the Cordilleras, where are formed its two main upper branches, the Rio Grande and the Rio de Barrancas, its course presents a remarkably uniform character. After issuing from the mountains it is joined by no more affluents on either side, and flows in the direction from north-west to south-east in a deeply eroded rocky channel.

Although traversing an arid region, where at times no rain falls for years together, the Colorado never runs dry. During the period of melting snows it forms a majestic watercourse, at once deep and rapid, with a breadth of from 1,000 to 1,300 feet. But in the winter season it dwindles to a shallow stream

Fig. 155.—URRE-LAFQUEN.

Scale 1 : 1,200,000.





BANKS OF THE RIO NEUQUEN.

far more extensive than that of the Colorado. All the running waters of the eastern slopes of the Andes between 36° and 41° south latitude are collected by the Neuquen and the Limay, its two main headstreams which enclose a vast triangular space about the foothills and the pampas.

The Neuquen, which rises near the Chillan volcano in the little lake Malbarco, 7,000 feet above sea level, is joined by numerous torrents before plunging into a wild gorge in the range of foothills below Piedra Lisa. It follows the eastern base of this range as far as its confluence with its largest tributary, the Rio Agrio, which issues from a longitudinal valley between two parallel Cordilleras. A short distance below the confluence nearly all the mountain tracks from the passes between Mounts Antuco and Quetrupillan, converge at the *Paso de los Indios*, that is, the chief ford, now guarded by a fort. Below this point the Neuquen sweeps round the plateau to its junction with the Limay; but in this part of its course it is joined by no other affluents.

THE RIO LIMAY.—LAKE NAHUEL-HUAPI.

The Limay, second main headstream of the Rio Negro, is formed by the confluence of numerous torrents which descend from the Argentino-Chilian water-parting in a space of about 185 miles north and south. Several lakes flooding old glacial valleys send their overflow to the impetuous Limay, which itself escapes from the famous Lake Nahuel-Huapi, "Tiger Island," so named from a long sedgy island occupying the centre of the basin.

Nahuel-Huapi, which occupies a depression of great importance on the line of a future trans-continental highway between Bahia Blanca and Valdivia, has been known for over two centuries. Here the Jesuit missionaries had already established themselves in the midst of the Araucanian Indians so early as 1670, and at the beginning of the eighteenth century they founded a settlement near the head of the Rio Limay. But this station was destroyed by an incursion of hostile natives, and although it was again visited by other missionaries, Nahuel-Huapi was not systematically explored till the year 1855.

Since that time numerous travellers have found their way to the shores of this lovely lake, and about 1878 it was formally occupied by the Argentine Government. Nevertheless, its contour lines are not yet accurately determined, and its form is differently represented by different observers. According to Siemiradzki this Alpine sea is much smaller than is usually supposed, being only 28 instead of 50 miles long, as stated by previous travellers, with an extreme breadth of not more than 9 or 10 miles.

But whatever be its size, all are unanimous in praise of this beautiful lake, in whose crystal waters are mirrored the surrounding heights, in one place bare trachyte cliffs, in another steep granite escarpments clothed with beech and pine groves, and dominated in the background by snowy pyramids. Its altitude above the sea is variously estimated at from 1,760 to over 2,000 feet.

Immediately after issuing from Nahuel-Huapi, the Limay trends round

abruptly northwards to a longitudinal valley separating the great Cordillera from the parallel range known as the Cordillera de los Cipreses. After receiving the overflow from Lake Treful the Limay pierces this rocky barrier, beyond which it is joined by the longer and equally copious Collon-Cura rising about 160 miles farther north. On its winding course southwards the Collon-Cura is joined by the emissary of the Aluminé lagoon, which stands near the divide between the Biobio and Rio Negro, and possibly sends its overflow to both basins.

Swollen by all the torrents from the Cordilleras, the Limay flows rapidly in a north-easterly course, flanked here and there by reddish cliffs, and elsewhere expanding in broad depressions studded with lagoons, the resort of myriads of water-fowl. The current, although very swift, nowhere develops rapids, so that a steamer with powerful engines might ascend all the way to Lake Nahuel-Huapi, and even penetrate into the Collon-Cura affluent.

THE LOWER RIO NEGRO.

At the confluence the Neuquen and the Limay have about the same mean annual discharge; but the Neuquen, traversing a more arid region, presents far greater discrepancies between high and low water. To judge from the disposition of its valley, the Limay would seem to be the true upper branch of the Cura Leofu, or Rio Negro, to which the Indians appear to have given this name, not from the colour of its waters, but from the rapids and other dangerous obstructions to its navigation. Flowing on a shingly or rocky bed, the stream maintains its pure sea-green colour throughout the year, except for two or three days after the floods, when it changes to "a dull red with the red earth that some swollen tributary hundreds of miles to the west has poured into its current. This change lasts only a day or two, after which the river runs green and pure again."*

Flowing in its broad, regularly inclined valley at first eastwards, then to the south-east, the "Black River" receives not a single tributary from the arid Patagonian plains. But although, under this rainless climate, it gradually loses volume on its seaward course, it still maintains a mean depth of over thirteen feet. About midway it breaks into two branches which ramify amid groups of shifting islands, forming the Choele Choele, famed in Patagonian history as the place where the native warriors crossed to swoop down on the Argentine settlements.

The Choele Choele, some 60 miles long with a mean breadth of 6 or 7 miles, consists of alluvial soil at a dead level clothed with bush and herbage. Right and left stretch low-lying plains bounded by the scarps of the plateau (here about 800 feet high), and often submerged by the flood waters of the Neuquen, derived in summer from the melting snows, in winter from the heavy rains on the mountain slopes. The Rio Negro glides silently into the sea through a single channel, without in any way modifying the trend of the shore-line.†

* W. H. Hudson, *Idle Days in Patagonia*, p. 36.

† Length of the Rio Negro from Lake Nahuel-Huapi to the sea 575 miles
 Area of catchment basin 50,000 square miles.
 Probable discharge, according to Guerrico 14,000 cubic feet per second.

THE CHUBUT AND SENGUER RIVERS.

A much smaller volume is sent down by the Chubut, a river whose very existence was still unknown in 1833, unless it is to be identified with the Rio Camerones of the old maps. Its farthest headwaters descend from the Cordillera south of Nahuel-Huapi, and once formed, the river flows without many windings through an "accursed land" of rocks and shingle, where affluents are rare on the south, and altogether absent on the north side.

The Senguer (Singerr, Senguel), chief tributary of the Chubut, rises on the Andes near the sources of the Aysen, and, according to a native report mentioned by Moreno, the Senguer (Chubut) forms with the Aysen a continuous waterway across the Continent from the Atlantic to the Pacific. It first traverses a splendid region of pastures and woodlands, a veritable Patagonian oasis; then, being deflected to the north-east by a barrier of rocks and other obstacles, its turbid current expands in a vast shallow basin which rises and falls with the seasons, and which, according to Fontana, stands about 1,000 feet above sea-level.

This basin, composed of the lakes Colhué and Musters, which are almost completely separated by a meridional chain of volcanic crests, is fringed on the south side by marshy tracts flooded by its overflow. Beyond this morass, where it loses a third of its volume, the Senger continues its course to the Chubut, without, however, contributing sufficient to make it navigable at all times. Boats can ascend with the flow, but they find only five or six feet of water in its bed except during the melting of the snows.

THE RIO DESEADO.

The Rio Deseado, "Desire," discovered by Cavendish in 1586, falls into the estuary of the same name south of the Gulf of St. George. It is even less copious than the Chubut, although it also traverses nearly the whole breadth of the Patagonian peninsula. Lake Buenos Ayres, which probably at one time fed the Deseado, has no longer any outlet, and now sleeps in its circular basin like a flooded crater.

In these Patagonian regions, which were formerly far more humid than at present, travellers have observed several other basins, which are now dry, but which were at one time filled with water, as is evident from the alluvial deposits on their beds.

At its mouth the Deseado is usually a mere rivulet, with a volume reduced at times to a few cubic feet per second, but after the rains it is swollen to the proportions of a considerable river. It reaches the coast at the head of an elongated inlet of extremely picturesque aspect, which extends for a distance of some 24 miles in the direction from west to east. The coast line is greatly diversified with numerous islands and islets, reefs and headlands, bays, ravines, and glens. All the eminences are extinct volcanoes, which were probably still

One of these basins, discovered by Moreno in 1877, and by him named the San Martin in honour of the Conqueror of Chacabuco, develops an irregular oval between lofty mountains of volcanic origin, whence descend glaciers and avalanches. East of this basin meres and lagoons occupy a deep trough dominated by the pyramidal Mount Kochait, "Bird," and other volcanoes. Towards the west these lacustrine depressions send their overflow to a still unexplored basin at the east foot of the Fitzroy volcano, which in its turn discharges into Lake Viedma, so named from Antonio de Viedma, who discovered it in 1782.

LAKES VIEDMA AND ARGENTINO.

Viedma, largest of all the basins in these sub-Andean regions, stretches a distance of about 50 miles in the direction from north-west to south-east. It is swept by fierce gales which raise huge waves like Atlantic billows, and on the west side a large glacier discharges great blocks, which float away in long processions towards the east side where they are stranded, and strew the shores with erratic boulders. Traces of ancient beaches show that the lake stood formerly at a much higher level than at present. Its waters have been carried off by the Rio Leona (Orr), which winds through a mountain gorge southwards, and to Lake Argentino, which it enters at its north-east corner. A now dry channel formerly carried the waters of the Rio Leona directly to the Rio Santa Cruz.

Lake Argentino, which was discovered by Gardiner in 1868, and afterwards visited by Feilberg in 1873, and navigated by Moreno in 1878, occupies that region to which Fitzroy and Darwin gave the name of the "Mysterious Plain." They even sighted and named two mountains, Hobler Hill and Castle Hill, which are bathed by its waters, without recognising the lake itself. At present the basin stands, according to Carlos Burmeister, at an elevation of 1,050 feet, but like Viedma, it formerly stood at a much higher level, and the traces of two ancient beaches may still be clearly followed above its present margin. Like those of the Swiss Alps, the lakes of the Argentine Andes appear to be extremely deep. Two miles from the shore Moreno failed to reach the bottom of Argentino with a sounding-line 122 feet long. They were originally perhaps fiords, like those on the opposite side of the Andes, and like them they have their deepest parts at the foot of the mountains, whence they shoal gradually seawards.

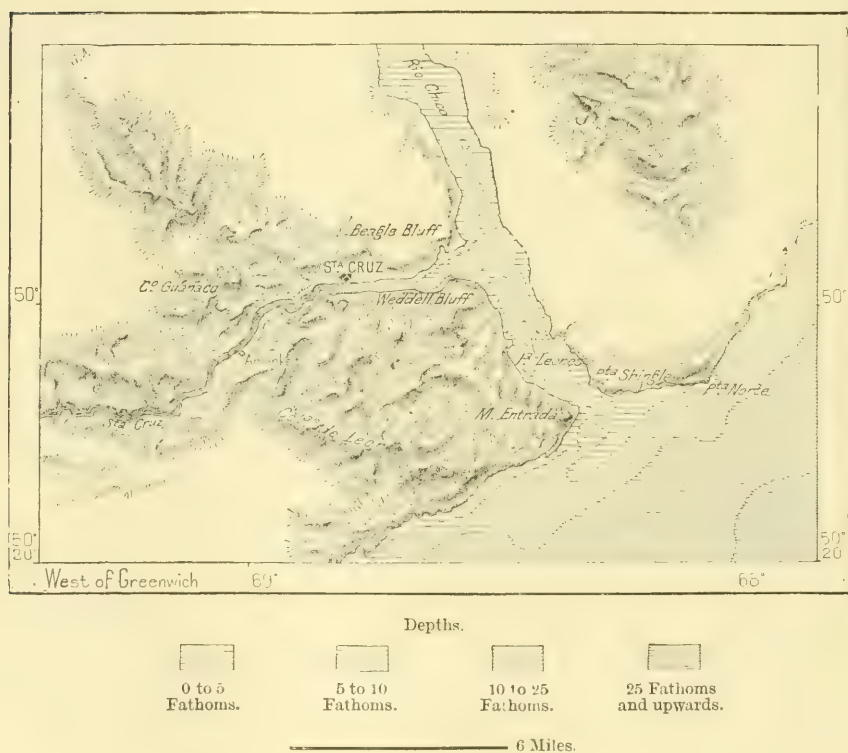
THE SANTA CRUZ AND CHICO RIVERS.

The Rio Santa Cruz, outlet of the chain of lakes which begin with Viedma, escapes from the east side of Lake Argentino a few miles below the mouth of the Rio Leona. The current is interrupted by rapids, which are impassable by boats, which have to be drawn up by ropes. But when the river is in flood, light craft

shoot these rapids at a velocity of 12 or 15 miles an hour. The Santa Cruz is certainly the most copious of all the Patagonian rivers, and Moyano estimates its discharge at no less than 30,000 cubic feet per second. It draws all its supplies from the lakes, for the little rain that falls farther east is absorbed in the surrounding volcanic scoriæ. Its channel and the lateral terraces are strewn with erratic boulders, huge masses of 17,000 or 18,000 cubic feet. Assuming that in the Upper Santa Cruz valley the average annual rainfall amounts to about 30 inches, a figure which seems approximately correct, the superficial area of a catchment basin necessary for the development of such a stream

Fig. 158.—MOUTHS OF THE RIOS CHICO AND SANTA CRUZ.

Scale 1 : 1,100,000.



as the Santa Cruz should exceed 13,000 square miles. Such in fact must be the extent of the region from which Lakes Viedma and Argentino draw their supplies.

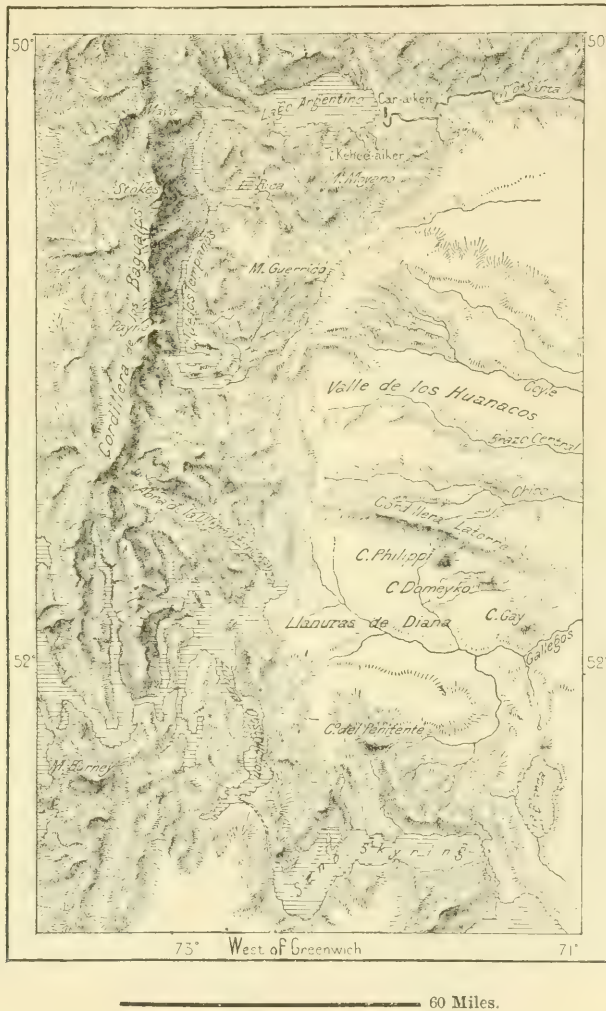
At its eastern extremity the fluvial valley, bordered by cliffs from 100 to 400 feet high, has quite the aspect of an ancient marine strait, and Darwin suggested the idea that it might have at one time formed a passage between the two oceans, like another Magellan Strait. This hypothesis, however, is not supported by the aspect of the mountains rising to the west of Lake Argentino.

In the estuary converges another river, the Rio Chico, which is often re-

garded as an affluent of the Santa Cruz. The Chico, which was explored in its lower course by Musters, and in its upper reaches by Moyano, flows, like the Santa Cruz, in a deep channel excavated in the basaltic plateau. But it is at no time navigable, and during the dry season it shrinks to a mere rivulet 120 feet wide, and easily fordable. It adds little to the volume of the Santa Cruz, and

Fig. 159.—FROM LAKE ARGENTINO TO THE SOUTHERN FIORDS.

Scale 1 : 2,500,000.



the average discharge of both in the common estuary is estimated at about 31,000 cubic feet per second. In this estuary, the tides, which are very swift, rise from about 10 feet on the bar at ebb to 50 or 60 at flow.

Lake Argentino is continued southwards by another basin, which according to some authorities stands at the same level of about 300 feet, while according to others it lies not more than a few feet above the sea. Moyano believes that the

two lakes communicate in some way, either through a channel or a series of rapids; but he was unable to verify the fact by actual observation.

Farther south a long stretch of fresh water, half river, half fiord, is developed at the foot of the mountains, in the direction of the glacial fiords, which form the ramifying inlets of Skyring Water.

South of the Santa Cruz estuary the coast presents other fiord-like indentations, half filled with silt, which receive some small streams descending from the Cordilleras. But all have their sources on the eastern slope of the volcanic range, and are consequently for the most part dry. Coy Inlet, which Darwin regarded as the remains of a marine strait, like that of Magellan, is joined only by a rivulet known as the *Coyle*, a corruption of *Coy*, the English name of the estuary. It was dry when visited by Moreno; but farther south the Rio Gallegos, rising in the fertile *Llanuras de Diana*, "Diana Plains," is a perennial stream, and even navigable for a few weeks in the year. All the running waters at the extremity of Patagonia wash down auriferous sands.

THE PATAGONIAN SEABOARD.

Viewed as a whole, the shores of Patagonia and Tierra del Fuego present no character of unity in their contour lines. Between Buenos Ayres and Bahia Blanca the semicircular bend of the seaboard is developed in a rhythmical curve, in which is revealed the result of slow and continuous geological action. So, also, at the extremity of the continent a similar movement in the formation of the coast-line is attested by the cimeter-shaped curved line which is described between Staten Island and Coy Inlet, and which is interrupted by the two Straits of Lemaire and Magellan.

But all the intermediate space extending from Bahia Blanca to the Santa Cruz estuary is indented in an extremely irregular fashion. South of Bahia Blanca, itself a tunnel-shaped estuary penetrating far into the interior of the continent, several parallel inlets which follow along the seaboard seem to indicate the existence of an old delta; only the river, which one might expect to see discharging into the head of the gulf, has long ceased to exist. By a remarkable contrast, both the Rio Colorado and the Rio Negro, instead of flowing in valleys forming a landward continuation of marine gulfs or inlets, follow the line of a ridge traversing the surrounding plains, and discharge into the Atlantic Ocean at the extreme convexity of lands projecting seawards.

Immediately south of the Rio Negro the Gulf of San Matias penetrates so far into the interior of Patagonia that it has received the alternative name of Bahia Sin Fondo, that is, "Endless Bay." On the other hand the Valdes or San José Peninsula, which encloses this bay on the south side, is connected with the mainland by a narrow isthmus with a hammer-shaped headland, which bends round to the right and left (north and south) in such a way as to develop two lateral inlets.

South of the regular semicircle formed by the spacious Gulf of St. George, the Rio Deseado presents a phenomenon analogous to that of the Rios Colorado and Negro. Instead of debouching in the vast gulf, which seems made to receive its discharge, it reaches the coast after traversing a peninsular tract which, like that of San José, encloses the gulf on the south side.

Natural havens are rare on this Patagonian seaboard, which is exposed to the

Fig. 160.—VIEW TAKEN IN THE ACHA VALLEY, CENTRAL PAMPA.



full fury of the fierce Polar winds. In the southern waters navigators show a preference for Port San Julian and Port Santa Cruz, although both are closed at ebb tide by bars with depths of not more than 8 or 10 feet. But the flow, which on these coasts rises to a height of from 30 to 50 feet, gives access to the largest vessels at all times. The approaches are much dreaded in the Gulf of San Matias, especially in the vicinity of the Valdes Peninsula. Here the chopping seas and conflicting currents cross and recross in all directions, developing exceedingly

dangerous whirlpools. Such is the force of the currents and eddies that they cause the plumb lines to drift, thus preventing accurate soundings from being taken in these troubled waters.

CLIMATE OF ARGENTINA.

With the exception of a small strip of territory in the extreme north, Argentina lies entirely within the south temperate zone, with a climate corresponding in some respects to that of west Europe, between the latitudes of Spain and the Feröer Islands. But between 22° and 25° south latitude there are naturally many transitions from north to south, and to these must be added the changes that take place from east to west between the Atlantic seaboard and the slopes of the Cordilleras. Hence arises an endless diversity of local climates, all however characterised both by a considerable range, and by sudden changes, of temperature. The general relief of the land, from the plains of Chaco to the rugged Fuegian Archipelago, leaves ample space for the play of the hot equatorial and cold antarctic winds, which are nowhere intercepted by any mountain barriers.

In the "Mesopotamian" region, and generally throughout North Argentina, the normal currents set in the same direction as the mountain ranges and watercourses, that is, from north to south, or from south to north, parallel with the Andes and with the Famatina and Aconquija foothills, parallel also with the Parana and Uruguay valleys. But a certain see-saw movement is observed between the eastern fluvial and the western highland regions. In the former the northern, in the latter the southern currents predominate.

Another contrast consists in the deflection of the north wind, which frequently sweeps from the uplands down to the plains. This is the much-dreaded *zonda*, which assumes the character of a gale, especially during the winter months from July to September. Both the true north wind and the *zonda* are accompanied by a considerable rise in the temperature, which has occasionally exceeded 104° Fah. Then any sudden shifting of the currents may be attended by a fall of 50° or even 54° Fah. within the twenty-four hours.

In winter, and under the prolonged action of the south wind, which clears the sky and promotes radiation, the glass may fall below freezing-point, and the Patagonian rivers, as far north as the Chubut, rapidly freeze. Such is the purity of the atmosphere, that at San Juan, near the foot of the Andes, the stars are said to be visible by day, even in the vicinity of the sun.

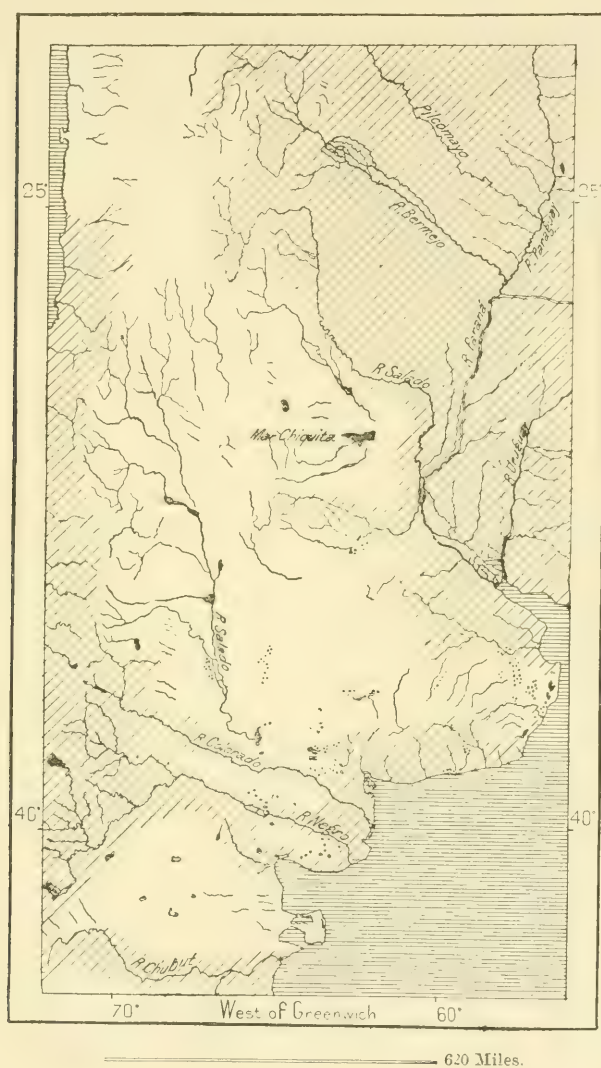
The coastlands about the Plate estuary and along the Atlantic seaboard enjoy the alternating *virazones*, land breezes prevailing during the day followed by sea breezes at night. This region is also exposed to the south-east trades, not only in summer, but also during a great part of the winter season. They sometimes blow with fury, and under the name of *su-estada* they churn up the estuary waters and stem the current of the Parana and Uruguay, causing these rivers to overflow their banks. Most of the shipwrecks in the Buenos Ayres roadstead are due

to these south-eastern squalls, which are nearly always accompanied by heavy rains.

Here also the less dangerous *pampero*, or pampas wind, blows with equal violence from south-west to north-east across the central plains, reaching at times as far as and beyond Cape Frio on the Brazilian coast. This pure, dry, and salubrious

Fig. 161.—CLOSED BASINS OF ARGENTINA.

Scale 1 : 20,000,000.



wind lasts sometimes only a few hours, at others several days. But on the whole, the climate of these coastlands is more equable, and scarcely ever exposed to the intolerable heats, which are felt, especially in calm weather, in the inland "Saharas."

In the conflict between the equatorial and polar currents, the former nearly

always prevail in Patagonia, where north-west winds set regularly for a part of the spring and throughout the whole of the summer season. They blow at times with such fury that riders are unable to keep the saddle, and have to dismount and seek shelter in some cleft of the rocks. In these *cañadones* an arborescent vegetation is able to maintain itself; but on the arid storm-swept plains nothing can thrive except low growths, bush, and herbage. The gales usually rise with the sun, and continue to increase in violence till the afternoon, when they subside, a dead calm often prevailing at night.

In the extreme south the aërial currents are far more capricious in the labyrinth of fiords, inlets, sounds, and narrow channels of Tierra del Fuego than on the open Patagonian steppe lands. As had already been observed by the navigator Anson, in the seventeenth century, fine weather never lasts very long in these high southern latitudes. The very clearness of the atmosphere is an indication to the weather-wise of pending storms.

As a rule, the rainfall decreases gradually in the direction of the south. On the Tucuman plains it is heavier than in the Argentine Mesopotamia, more copious in this region than in Buenos Ayres, in Buenos Ayres than in Patagonia. There is also a falling off in the direction from east to west, aridity increasing with the distance from the seaboard. Here dews are copious, and fine drizzly rains occur, like the "Scotch Mists" of Europe. But farther inland, and notably in the San Juan district, such phenomena are almost unknown, and are replaced by tremendous downpours, at times accompanied by thunder and hail-storms. Such heavy showers appear to be an abnormal phenomenon, which is attributed to the conflict of opposing aërial currents. At Buenos Ayres, and on the surrounding plains, snow is of extremely rare occurrence. Nevertheless, Hermann Burmeister was able to record the fall of a few flakes, as an exceptional event, in the year 1871.

Taken as a whole, Argentina, even on the seaboard, lacks sufficient moisture for agricultural pursuits. The people of Buenos Ayres have not yet forgotten the *gran seca*, "great drought," which prevailed from 1827 to 1831, and during which only a few passing showers fell on the plains. In the interior these droughts last even longer; but here the settlers depend not so much on the rainfall as on the melting snows of the uplands, which feed the irrigation rills, and on the artesian wells that have been sunk to a depth of 300 feet and upwards in many districts.

It would, however, almost seem as if the climate has everywhere become drier, snow being apparently less abundant than within a recent epoch. To the lack of moisture, whether under the form of snow or rain, is due the exhaustion of so many rivers on the northern plains and in Patagonia. In the "accursed lands" traversed by the Rios Colorado and Negro, mere channels destitute of any affluents, showers are extremely rare, and at times not a drop falls for years together. The stations on the railway lines in the solitudes south of Buenos Ayres receive their water supply regularly with each train. Elsewhere travellers have to put up with the brackish fluid that oozes in many places from the ground. In these districts

the pumas die of thirst, and the sheep of hunger, and the vegetation is kept alive entirely by the morning dews.*

According to the observations of Moreno, the most arid district in the whole of Patagonia is the region comprised within the basin of the Rio Deseado, a long river which descends as a copious stream from the snowy uplands of the Cór-dilleras, but which is reduced to the proportions of a mere rivulet before it reaches its vast fiord-like outlet on the shores of the Atlantic. But if the plateaux and plains sloping towards the Atlantic are destitute of moisture, the Andes regions enjoy an abundant rainfall. The north-west winds, which blow with great violence, and which discharge their contents on the slopes of the Pacific, find numerous breaches through which they are able to reach the opposite side, which thus receives a portion of their humidity.

The other atmospheric currents, being arrested by the higher summits, also precipitate some of their moisture in the form of rain or snow, and thus are developed a few glaciers here and there on the crests of the Cordilleras. On the Argentine side is also developed a chain of lakes along the foot of the highlands, and numerous basins, whose liquid contents have long been evaporated, appear to have at one time formed an almost continuous waterway between Lake Nahuel-Huapi and Magellan Strait. On the other hand, Tierra del Fuego is still sufficiently watered, even on the eastern plains roamed by the Ona nomads.

In connection with the climate of Patagonia the naturalist John Ball argues, against the commonly received opinion, that the southern is not colder than the northern hemisphere. The mean temperature of the three points south of 50° south latitude, from which meteorological observations are available, considerably exceeds 42° Fahr., as shown in the subjoined table :—

	S. Latitude.	Mean Annual Temperature.
Falkland Islands	51°41'	about 43·00° Fahr.
Punta Arenas	53°25'	„ 43·52° „
Ushuaia (Beagle Channel)	54°53'	„ 42·39° „

This, compared with corresponding places in the northern hemisphere, is four or five degrees higher, except in such favourably situated localities as Sitka, on

* Meteorological conditions of various towns in Argentina :—

	Latitude.	Height	Temperature.			Rainfall.
			Max.	Mean.	Min.	
Salta	24°46'	3,935 feet.	109° Fahr.	63° Fahr.	24° Fahr.	23 in.
Tucuman	26°50'	1,480 „	104° „	68° „	16° „	39 „
Santiago del Estero	27°48'	690 „	113° „	70° „	29° „	19 „
Catamarca	28°28'	1,700 „	109° „	69° „	25° „	10 „
La Rioja	29°26'	1,660 „	109° „	67° „	32° „	12 „
Chilecito	29°12'	3,530 „	104° „	63° „	32° „	11 „
Cordoba	31°25'	1,576 „	111° „	61° „	16° „	26 „
San Juan	31°32'	2,130 „	108° „	65° „	27° „	3 „
Mendoza	32°53'	2,500 „	100° „	60° „	29° „	6 „
San Luis	33°18'	2,364 „	103° „	61° „	25° „	24 „
Rosario	32°56'	24 „	101° „	63° „	29° „	40 „
Buenos Ayres	34°36'	66 „	100° „	64° „	30° „	34 „
Bahia Blanca	38°45'	50 „	105° „	60° „	23° „	19 „
Rawson	43°17'	100 „	100° „	54° „	14° „	12 „
Ushuaia	54°53'	32 „	81° „	42° „	13° „	?

the north-west coast of North America. "The general conclusion, which seems to be fully established, is that the southern hemisphere is not colder than the northern, and that all arguments based upon an opposite assumption must be set aside. I think that this belief, as well as many others regarding physical geography, originated in the fact that physical science, in its mere exact form, had its birth in Western Europe, a region which, especially as to climate, is altogether exceptional in its character. The further our knowledge, yet too limited, has extended in the southern hemisphere, the less ground we find for a belief in the supposed inferiority of its mean temperature. What we do find, in exact conformity with obvious physical principles, is that in the hemisphere where the water surface largely predominates over that of the land, the temperature is much more uniform than where the land occupies the larger portion of the surface. In the former the heat of summer is mainly expended in the work of converting water into vapour, and partially restored in winter in the conversion of vapour into water or ice." *

FLORA OF ARGENTINA.

Tropical woodlands analogous to those of the Brazilian selva and certain parts of Paraguay occur only in the provinces of Salta, Jujuy, and Tucuman at the foot of the Platean border ranges, and in Chaco along the banks of the Pilcomayo and Bermejo. Round its margin this forest region passes by gradual transitions to the natural parklands, where the woods intermingled with the prairies constitute the fairest and most fertile districts of Argentina. All the forest species are represented in these scattered woods and thickets, which occupy considerable tracts in the northern provinces. But the more valuable timber, cabinet and dyewoods, are already disappearing in the neighbourhood of the large towns.

From the lack of moisture and vegetable humus, and from the presence of saline elements in the soil, the vegetation acquires a peculiar character. In such a climate those trees alone can flourish which bear slender leaves, spikes, or thorns, diffusing little shade. On the slopes bordering Catamarca and Santiago del Estero are met the *cabil*, a species of acacia useful for tanning purposes, and the *quebracho colorado* (*Isopterygium Lorentzii*), also rich in tannin, and owing to its strength and elasticity much valued for railway sleepers.

On the dunes, and generally in the sandy districts, the most common tree is the algarrobo (*prosopis*), while regiments of the woody cactus and more ramifying Barbary fig are characteristic of a very dry soil. In Chaco most of the space is occupied by palm groves composed mainly of the *copernicia cerifera*. Farther south they diminish in extent, breaking into small thickets or clumps chiefly consisting of the *trithinax campestris*. The yatai (*cocos yatai*) occurs more especially in the provinces of Corrientes and Entre-Rios between the Parana and Uruguay rivers, which region contains four of the ten or twelve palms peculiar to the Argentine flora. In some districts thorny trees, such as the *gleditschia amorphoides*, develop

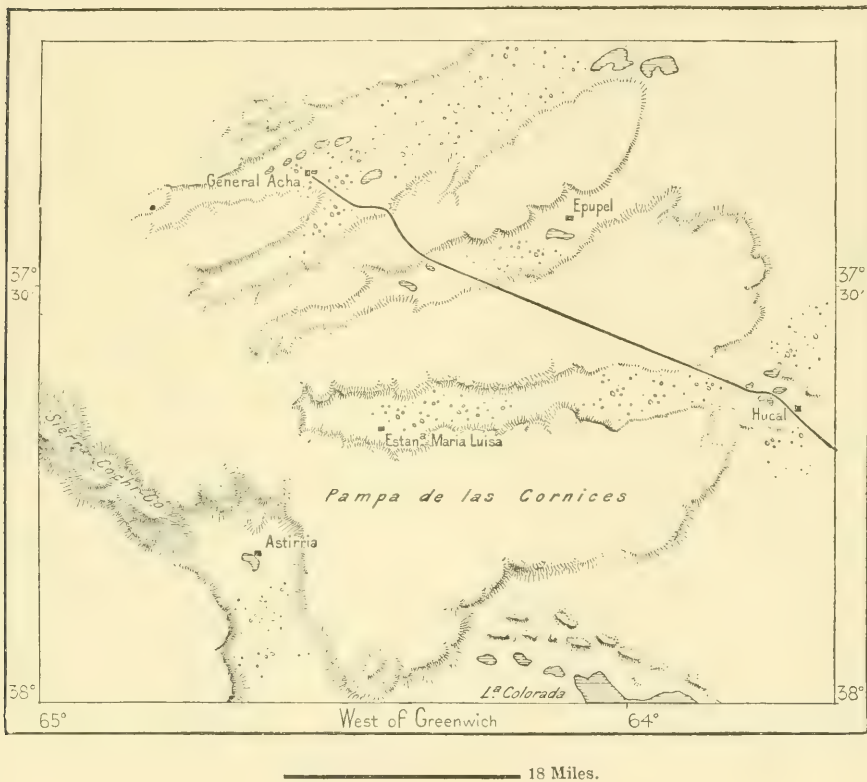
* *Notes of a Naturalist in South America*, pp. 272—3.

such a tangle of sharp points that they form a veritable snare, in which animals run the risk of perishing.

The forests are not arrested abruptly on the verge of the pampas, into which are projected wooded headlands and islands, while elsewhere grassy glades appear amid the groves and thickets. Since the arrival of the Europeans the indigenous herbaceous flora of the pampas has been invaded by numerous species introduced from the Old World, which have rapidly spread from the seaboard to the foot of the Andes. Thus several varieties of the thistle have taken possession of the plains, where in dry seasons they grow so thickly as to be quite impenetrable.

Fig. 162.—FLORAS OF THE PLATEAUX AND RAVINES.

Scale 1 : 1,000,000.



These European species would appear to have improved the pasturage by the development of the *pasto blando* or *pasto tierno*, tender herbage good for sheep, with a corresponding decrease of the *pasto duro*, or coarse grasses on which horses chiefly graze.

Compared with the other vegetable zones the pampas flora comprises but a small number of species, which, however, are remarkable for their prodigious expansion. But the *gynerium argenteum*, known in Europe by the name of "pampas grass," does not occur in the pampas proper, but only on the slopes of the mountains, and in the moist barrancas or bottom-lands on the Patagonian frontier.

Not a single indigenous tree is met in the true pampa, and those now growing, even far from human habitations—eucalyptus, poplar, peach, and others—have all been introduced by man. Conspicuous amongst them is the ombu (*phytolacca* or *pireunia dioica*), with a huge spongy stem, dull ball-shaped foliage, and gnarly roots trailing over the surface.

Southwards the pampas flora scarcely extends beyond Bahia Blanca; but farther inland it still reaches the Colorado valley, which may be taken as the northern limit of the scrubby vegetation of Patagonia. In this zone there is a total absence of pasturage properly so-called, although a few tufts of grass and other herbs grow about the stems of the thorny and gnarly shrubs. In the whole of the vast Patagonian region Lorentz and Niederlein had enumerated not more than 300 distinct species in 1884. Here the prickly cactus presents in many places an impassable barrier to men and horses. In the Rio Negro valley the only large tree is a species of willow (*salix humboldtiana*), which may, perhaps, be of European origin. But even this is rapidly disappearing under the axe of the woodman. On the terraces dominating the river banks the most common "tree," a mere shrub in appearance, is the *chañar* (*gourliea decorticans*), which in October decks itself with yellow flowers resembling the broom.

Amongst the few Patagonian plants possessing some economic value are the "incense" tree (*duraua magellanica*), which yields an excellent resin, and the Santa Cruz "tea" (*micromeria Darwinii*), a very small plant, with the leaves and large roots of which is made a highly aromatic infusion tasting like mint. The *berberis buxifolia* grows in such abundance on certain inland dunes that its bluish colour is visible miles away, and when the supply of guanaco meat fails, the Indians live exclusively on the berry of this plant. From a species of juniper they obtain the so-called *maken*, a gum which all Patagonians chew, and which acts both as an excellent dentifrice and as a substitute for tobacco.

About the sources of the Santa Cruz the slopes of the Cordilleras are clothed with continuous forests of the "antarctic beech," which intertwines its branches above the gorges, where the wild horse has taken refuge. Farther north the hillsides are covered with "oaks" and "cypresses," while the apple, introduced by the Jesuits, flourishes vigorously in the upland valleys, where the head-streams of the Rio Negro take their rise.

FAUNA OF ARGENTINA.

During tertiary and even quaternary times, the southern regions of the Continent had a far richer fauna of large animals than at present. The deposits of fossil mammals discovered by Darwin near Bahia Blanca were embedded in a layer of stratified gravels and of reddish mud, such as might at present be formed by the sea on a shoaling beach. The associated shells belonged in fact to recent or even contemporary species. Most of the glyptodons or gigantic armadillos brought to light in the pampean formation just below the vegetable humus are as perfect as the skeletons of horses or oxen lying on the surface. Hence the conditions of

the animal kingdom were at that time much the same as at present. There were no huge carnivorous beasts to break and scatter the bones, but only, as at present, vultures and other carrion birds to devour the flesh. According to the Indians the glyptodon survived till quite recently, and appears to have been certainly contemporary with man. Roth found a human skeleton in the hollow ground excavated beneath the natural roof formed by the huge carapace of one of these animals.

A striking feature of this Platean and Patagonian tertiary fauna is the astonishing abundance and variety of species concentrated in a narrow space. The Bahia Blanca beds, little more than about 250 square yards in extent, contained skulls of the megatherium; a megalonyx; a nearly perfect scelidotherium, a quadruped of the same family, but showing relations, on the one hand, with the ant-eater, on the other with the armadillo; three gigantic species belonging to the group of edentates; a horse; a tooth of the macrauchenia, ancestor of the camel and of the llama; lastly a toxodon, a strange creature approaching the elephant in size, the rat in its dentition, and the manatee in its aquatic habits, with a general resemblance in form to the capivara of the Parana.

On the banks of the Santa Cruz and other South Patagonian rivers explorers have found numerous remains of hitherto unknown mammals, all of which have not yet been completely classified. Amongst the most interesting finds in this region is a gigantic bird larger even than the New Zealand dinornis. Altogether the extinct Patagonian fauna rivals in number and importance that of the Bad Lands of the North American Far West.

From the great variety and huge size of these remains it has been inferred that the terminal peninsula of America is a mere remnant of a vast Continent, which comprised the islands now scattered over the South Atlantic Ocean. The amazing accumulation of fossils occurring under the volcanic tuffas support the hypothesis that at that time the animal kingdom was here represented by myriads of individuals. At present, were all the animals of the plains involved in some sudden catastrophe, their skeletons would be found very thinly scattered, except in the case of gregarious animals herding together.

But however this be, Buffon's remark that the size of the animals corresponds to some extent to that of the continents inhabited by them, does not appear to be justified by the character of the old tertiary fauna of Patagonia. However large this peninsula may have been at that time, it can scarcely have been another Africa. But in the contemporary geological epoch most of the genera are represented by species of larger proportions in the New than in the Old World.

By a remarkable phenomenon of correspondence, the present fauna of the temperate regions in South America resembles that of the northern continent. In this respect Argentina and Patagonia correspond to the States bordering on the great Canadian lakes; if not in their specialised forms, at least in their genera. In certain districts of both regions all the types might almost be regarded as identical. But in respect of the invertebrates belonging to the marine fauna, it has been observed that the corresponding animal forms are met on the shores

of South America at a far greater distance from the equator than is the case on the North American seaboard. Thus molluscs of the voluta and oliva types, which do not occur in the United States beyond the thirteenth degree of latitude, are seen in abundance as far south as the parallel of Bahia Blanca (39° S. lat.) in Patagonia. The voluta is common even in Magellan Strait, about 1,000 miles farther south. A phenomenon of analogous character is presented by the marine fauna on the southern shores of the African Continent.*

The Rio Negro forms approximately the divide between the Argentine and Patagonian zoological zones. This line is never crossed by certain species, such as the ñandu ostrich (*rhea Americana*) and the smaller *rhea Darwinii*, which keep to their respective northern and southern domains. The Patagonian jaguar also is of much smaller size than the Chaco species.

Another natural parting-line is formed by the barrier of the Andes, although these frontiers are surmounted by some animals. The puma (*felis concolor*) ranges as far south as the Magellan Strait, and Patagonia is also inhabited by two kinds of wild cats, dogs, a small armadillo (*dasypus minutus*), and mice, more numerous here than in any other part of the world. The Condor, which in Ecuador descends not even to the level of the Andean foothills, in Patagonia sweeps down to the shores of the Atlantic. In this terminal region reptiles are rare, and land and lacustrine molluscs relatively still rarer. Marine life of all kinds—birds, cetaceans, fish, and lower organisms—abounds in the Magellanic archipelagoes, although some species are already threatened with destruction. The penguins, formerly met in myriads drawn up like soldiers on the overhanging rocks, have disappeared from several of the insular groups.

In North Argentina three families of monkeys are still represented in the forest regions of the Missions and Corrientes, and farther west on the slopes of the Jujuy and Salta mountains towards the Bolivian frontier. Bats are much rarer than in Brazil, and the phyllostome vampire is no longer seen south of Tucuman; even here it is much less dangerous than in the tropics. The carnivora are represented by numerous species, although the felidæ, such as the Jaguar and Ocelot, are retreating before the farmers and other settlers. In the Platean regions the puma never attacks man, and will not even defend itself except by tears from his assaults. This point has been much discussed by naturalists; but the fact has been placed beyond doubt by the researches of Mr. Hudson, who mentions several authentic cases, and suggests an explanation of the remarkable phenomenon. "All that I had previously heard," he writes, "had compelled me to believe that the puma really does possess a unique instinct of friendliness for man, the origin of which, like that of many other well-known instincts of animals, must remain a mystery. The fact that the puma never makes an unprovoked attack on a human being, or eats human flesh, and that it refuses, except in some rare cases, even to defend itself, does not seem really less wonderful in an animal of its bold and sanguinary temper, than that it should follow the traveller in the wilder-

* Henry A. Ward, *Revista del Musco de La Plata*, Vol. I. 1890—91.

ness, or come near him when he lies sleeping or disabled, and even occasionally defend him from its enemy the jaguar. We know that certain sounds, colours, or smells, which are not particularly noticed by most animals, produce an extraordinary effect on some species; and it is possible to believe, I think, that the human form or countenance, or the odour of the human body, may also have the effect on the puma of suspending its predatory instincts, and inspiring it with a gentleness towards man, which we are only accustomed to see in our domestic carnivores, or in feral animals towards those of their own species.

“Wolves, when pressed with hunger, will sometimes devour a fellow-wolf; as a rule, however, rapacious animals will starve to death rather than prey on one of their own kind; nor is it a common thing for them to attack other species possessing instincts similar to their own. The puma, we have seen, violently attacks other large carnivores, not to feed on them, but merely to satisfy its animosity; and, while respecting man, it is, within the tropics, a great hunter and eater of monkeys, which of all animals most resemble man. We can only conclude with Humboldt that there is something mysterious in the hatreds and affections of animals.” *

Neither the tapir nor the peccary of the hot, moist forest regions ever ranges farther south than the provinces of Corrientes and Santiago del Estero. The sloth also is found no farther south than Chaco, while the ant-eater, very common in the northern solitudes, is rare in the Argentine provinces.

The tatu (armadillo) family is represented by at least eight species, including the gigantic tatu, now rare in the Toba territory north of the Rio Bermejo, the dwarfish *quirquincho* of the province of Mendoza, no bigger than a mole, and the hairy armadillo (*dasypus villosus*), which has now acquired protective nocturnal habits. This species is specially remarkable for its versatility and power of adaptation to changing environments. Its habits are constantly changing to suit its new conditions of life, so that it remains diurnal in districts where its carnivorous enemies are nocturnal, and becomes nocturnal in the presence of its persecutor, man. In this way the hairy armadillo is able to hold its ground, and even become more abundant, in regions occupied in increasing numbers by human settlements.

But the most characteristic animal of the pampas is the *viscacha* (*lagostomus trichodactylus*), which in many respects recalls the prairie dog of North America, and like it builds itself underground cities in the sandy soil. Here also it is found in friendly association with the owl and other nocturnal birds, which are often seen mounting guard at the mouth of the burrows. These burrows are also frequented by vipers, adders, and poisonous spiders, and travellers crossing districts occupied by colonies of viscachas never fail to provide themselves with a clove of garlic, believed by all Argentines to be an infallible protection against the attacks of all such noxious vermin. Like the bower-bird, the viscacha loves to decorate the approaches to its dwelling with all kinds of objects, shreds of

* W. H. Hudson, *The Naturalist in La Plata*, p. 49.

cloth, bits of leather, old shoes, bleached bones, dry roots and branches, or whatever other "inconsidered trifles" it can pick up on the surrounding pampa.

Hence caravans find it convenient to encamp in the vicinity of the *viscacheras*, where they have an abundance of fuel ready to hand for cooking purposes. During the day these *viscacheras* may be recognised at a distance by the herbage, which is cropped short at the entrance, but which grows in tall tufts on the surface of the ground above the burrows. But at night the rider has to guard against the risk of his mount stumbling and perhaps breaking a leg by falling through the roof of some underground dwelling. The Indian horse, however, being accustomed to nocturnal expeditions, keeps his head down, smelling the ground like a hound on the scent, and his instinct thus enables him generally to avoid the danger.

Between the Colorado and Rio Negro the most common animal is the marra, or "Patagonian hare" (*dolichotis patagonica*), which is met in groups of twenties on either side of the tracks across the bush. In the cultivated parts of the pampa game, instead of diminishing, as might have been expected, has greatly increased, thanks to the cessation of the steppe fires, which formerly destroyed the young and the lairs.

The guanaco (*huanaco*), which in Patagonia ranges over the stony wastes as far as the seaboard, has been exterminated throughout a great part of the Argentine foothills. It is now rarely met in the Rioja and Catamarca districts; but in the province of Jujuy both the guanaco and vicuña are respected by the Quichua natives, and here they may still be seen grazing in flocks of hundreds by the wayside. In South Patagonia the Tehuel-che natives capture about 300,000 guanacos every year without appreciably reducing their numbers. In the district between Lake Argentino and the Latorre Cordillera Rogers and Ibar saw as many as 5,000, and they calculated that there must be about 1,200,000 in the whole region. The wool is woven into ponchos and blankets; and cloaks, which command a high price on the Buenos Ayres market, are made of the skins of young guanacos stitched together with ostrich sinews.

Like the camel, its congener in the Old World, the guanaco is able to pass days without drink, and when driven to it, can slake its thirst even with brackish water. The male animal, being of solitary habits and swift in flight, is difficult to capture; but the females associating in herds, and possessing less staying power, fall easier victims to their pursuers. In South Patagonia, the guanaco, when fatally wounded or in a moribund state, retires to some solitary bush or thicket to die in peace. The ground in such places is often found strewn with thousands of skeletons. This strange instinct, first noticed by Darwin and Fitzroy, has since been fully confirmed by other observers. It is noteworthy that it is only at the southern extremity of the continent that the guanacos have dying-places; elsewhere they do not appear to have developed the habit, in the explanation of which the naturalist, Hudson, suggests that the guanaco, in withdrawing from the herd to drop down and die in the ancient dying-ground, is in reality only seeking an historically remembered place of refuge, and not of death. He mentions an analogous impulse in the Argentine riding-horse, which will also come home, or

to the gate of its owner's house, to die, although in the healthy state it avoids its master as an enemy, and has to be captured with a lasso. "In this case also the explanation would appear to be that the animal remembers how relief is always sure to come at his master's door, after he has been ridden for twelve or fifteen hours on the pampas, burdened with the ponderous native saddle, with its huge surcingle of raw hide drawn up so tightly as to hinder free respiration." *

The Argentina avifauna is represented by a great diversity of forms, from the huge vulture to the tiny humming-bird. It includes many species of parrokeets, as well as the Condor, still common in the Sierras de Sans Luis and de Cordoba, and the ñandu ostrich, which is now a familiar sight in many farm-yards. Of the aquatic birds the largest is the "race-horse duck," better known as the "steamer duck," from the close resemblance which the action of its wings bears to the beat of the paddles as it moves with surprising rapidity, half swimming, half flying, over the surface of the water, and leaving a long streak in its wake. They live chiefly on mussels, and some of the drakes are nearly four feet long from the bill to the extremity of the tail.

In the Pampas flamingoes abound. They are considerably smaller than the African species, but of richer colour. The slender legs, about sixteen inches long, are of a bright red hue, like that of the tail feathers, while the general plumage is of a delicate rosy tint, contrasting with the black colour of the pen feathers. These aquatic birds may often be seen wading in the shallow saline lagoons of the pampas in such numbers as to impart a lovely roseate colour to the scene viewed from a little distance. The effect is much heightened by the constant flash of the various tints in the sunlight, as they flap their wings or take flight when startled by any sudden noise.

Like the other divisions of the Argentine fauna, the reptile world attests a general falling off of vital energy south of the torrid zone. The various species of turtles are smaller than their Brazilian congeners; the jacaré alligators, which swarm in the lagoons and lakes of Corrientes, average scarcely more than six or seven feet in length, and rarely reach ten. South of Santa Fé they have disappeared altogether. The boas are not met beyond the region of Santiago del Estero, and the rattle-snake ranges no farther south than the Cordoba uplands.

Amongst the blood-sucking insect pests mention is made of the ixodes, a species of tick of the jigger type, which swarms throughout Argentina, and ranges as far north as Central America. They are a fearful nuisance, and seem to pervade the very atmosphere. Clustering in myriads about the tips of twigs and branches, they attach themselves to every passing animal by means of the hooks with which their feet are armed. Lean and flat when vegetating on the plants, they swell to the shape and size of a Barcelona nut after feasting on their victims. "The white globe is leathery, and nothing can injure it; the poor beast cannot rub, bite, or scratch it off, as it is anchored to his flesh by eight sets of hooks and a triangle of teeth.

* Hudson, *The Naturalist in La Plata*, p. 324.

"The ticks inhabiting regions rich in bird and insect life, but with few mammals, are in the same condition as mosquitoes, as far as the supply of blood goes; and, like the mosquitoes, they are compelled and able to exist without the nourishment best suited to them. They are nature's miserable castaways, parasitical tribes lost in a great dry wilderness where no blood is; and every marsh-born mosquito, piping of the hunger gnawing its vitals, and every forest tick, blindly feeling with its grappling-irons for the beast that never brushes by, seems to tell us of a world peopled with gigantic forms, mammalian and reptilian, which once afforded abundant pasture to the parasite, and which the parasite perhaps assisted to overthrow." *

Nearly all the Argentine waters, marine, fluvial, and lacustrine, teem with fish, one of which, a large trout of excellent flavour, lives both in fresh and salt water. Cetaceans of all kinds were formerly very numerous everywhere, and sea-lions and other seals are still pursued in the Patagonian waters. But the whale is now scarcely met farther north than Fuegia.

INHABITANTS OF ARGENTINA.

It is difficult to unravel the complicated prehistoric relations in Argentina, owing to the great variety of human types and remains of all kinds brought to light in recent times. Thus earthenware has been found in the pampas of Buenos Ayres, which even experts cannot distinguish from vases collected in the Aztec burial-grounds. In the Rio Dulce valley, near Santiago del Estero, sepulchral urns have been unearthed containing human remains mingled with shells of the same species as those now living in the Pacific waters. Certain blocks of stone or of wood are absolutely identical with those worked by the Maori of New Zealand and the Melanesians of the New Hebrides. But whether all these resemblances point at racial affinities, independent parallel developments, migrations, or commercial intercourse, are questions which cannot yet be solved.

Throughout the north-western Argentine uplands from the province of Jujuy to that of Mendoza, numerous ruins, earthworks, towns, and strongholds, are found on the heights and in the surrounding valleys. Some stand at an elevation of over 13,000 feet, at times on steep escarpments, and even in the clefts of vertical walls, like the Arizona and New Mexico cliff dwellings. Most of them had to be approached by ladders giving access to thick walls or terraces, whence a descent could be made to the quadrangular courts lined by habitations in the form of caves.

The industrial arts of these unknown builders were also considerably developed, as shown by the great highway known as the "Incas' Road," but by Moreno believed to be anterior to the Inca period. It may still be followed for hundreds of leagues east of the Andes in a straight line across the plains, with branches on both sides running to former populous districts, when this region was traversed

* Hudson, *The Naturalist in La Plata*, p. 142.

by great watercourses, and studded with vast lacustrine basins, which have long disappeared. The rock inscriptions, which are very numerous along this route, are different from those of the Peruvian Quichuas, and seem to belong to another civilisation. Here, also, are seen the remains of extensive irrigation works, and here have been found woven fabrics, stone, copper, bronze, and silver objects, all bearing witness to a tolerably advanced culture, destroyed partly by wars waged in prehistoric times, and partly also by the general desiccation of the land.

Even as far south as Patagonia the Argentine regions appear to have been formerly thickly peopled. Scarcely a district, however inhospitable it may now seem, but has yielded proofs of the migrations or long sojourn of vanished races. At Ensenada potsherds have been dug up over 200 feet below the surface, and the varying types of skulls, implements, and rock carvings show that these communities belonged to several stocks. Argentina is a vast necropolis of extinct populations, some of whom may now be represented by degenerate Yahgans, Alakalufs, and other Fuegians. In the Samborombon basin, south-east of Buenos Ayres, Carles discovered near a megatherium a remarkable human skeleton with thirteen dorsal vertebræ.

In the Rio Negro valley Moreno has examined a large number of *paraderos*,* as the sites abounding in prehistoric remains are called. They have yielded arrow-heads both of the paleolithic and neolithic ages, the former usually on the upper slopes and terraces along the river banks, the latter strewn in great abundance over the bottom-lands. Near Carmen, Hudson found some of the neolithic types about half an inch long, "most exquisitely finished, with a fine serration, and without exception, made of some beautiful stone—crystal, agate, and green, yellow and horn-coloured flint. It was impossible to take half-a-dozen of these gems of colour and workmanship in the hand and not be impressed at once with the idea that beauty had been as much an aim to the worker as utility." †

In the pampas region farther north archæologists have discovered human settlements of a somewhat different type from the ordinary *paraderos*, and in some respects resemble kitchen-middens. These certainly indicate the sites of human encampments long occupied by primitive populations. The total absence of any traces of disturbance altogether excludes the theory at first put forward that they may have been the abodes, not of the living, but of the dead. Those found in many parts of the province of Buenos Ayres have been fully described by Moreno and Zeballos, while the attention of Ameghino has been more especially directed towards the *paraderos* occurring along the banks of the Marco-Diaz, Lujan and other streams. One of the *paraderos* in the Marco-Diaz valley covers a superficial area of no less than 612 feet by 408 feet, and must have been occupied either continuously or at intervals for countless generations.

* This word, which is of constant occurrence in writings on the early history of man in Argentina and Patagonia, is derived from the Spanish *parar*—to sojourn. The *paraderos* are generally supposed to occupy the sites of ancient habitations or settlements, and this view certainly offers the best explanation of the numerous traces of burnt earth strewn about, and apparently caused by the action of fire kindled for cooking purposes.

† *Op. cit.*, p. 39.

Numerous animal remains, often covering a considerable space, are here and there found scattered about in the vicinity of these prehistoric settlements. "The long bones are split, others show grooves and cuts; nearly all have been subjected to the action of fire. With these bones have been picked up stone implements, chiefly arrow-points and fragments of clumsy and badly-baked pottery, showing, however, traces of artificial colouration. Heaps of burnt earth and charcoal cinders tell clearly of the hearths of men.

"All the bones, whether of mammals or birds, are of species such as the deer or llama (huanaco) still extant in South America; nowhere are any bones found, such as those of frequent occurrence in the pampas formation, belonging to extinct animals. The paraderos must not therefore be confounded with these formations, and their much more modern character brings them near to that of the ordinary shell-heaps.

"Recent discoveries have lately confirmed this conclusion. Excavations in a tumulus of elliptical form (260 by 105 feet and 8 feet high) on the Parana, near the port of Campana, have brought to light a great many objects which bear witness to an advanced state of culture. There are weapons and tools of quartz or of blue granite, often of remarkable workmanship, hand-mills very like those still in use in the interior of Africa, implements of deer-horn (*cervus rufus* and *cervus campestris*), whistles of venado-wood, and above all, a considerable number of fragments of pottery, very superior in execution to any hitherto noticed. Some of these fragments are coloured red, others are decorated with designs or ornamentation. Dr. Zaballos speaks of more than 3,000 potsherds, amongst them twenty *ollas* or jars still intact.

"Amongst these pieces of pottery must be mentioned some very close imitations of animal forms, especially a parrot's head, very true to life. The works of man lay mixed together in a considerable accumulation of large pieces of charcoal, fish and mammal bones. It is evident that this mound concealed one or more primitive hearths, and that these hearths, in accordance with a custom common to many different races, afterwards became burial-places; the discovery of several human skeletons leaves no doubt on this point."*

At the arrival of the Europeans early in the sixteenth century, Argentina—from the Bolivian plateaux to the Austral seas—was peopled by a multitude of tribes bearing different names, but belonging in reality to a small number of distinct ethnical groups. The north-western region belonged to the Calchaquis of Quichua culture, speech, and perhaps origin. In the Mesopotamia between the Parana and Uruguay the Guarani were dominant, and branches of this widely-diffused nation extended beyond the rivers far into the pampas; south of Campana, Estanislao Zaballos discovered a vast Guarani barrow containing twenty-seven skeletons, and the local nomenclature shows that they reached southwards, even beyond the Plate estuary as far as the Rio Salado and Samborombon Bay. The Querandi, who inflicted such a disastrous defeat on the

* De Nadaillac, *Prehistoric America*, p. 54.

Spaniards near the present site of Buenos Ayres, may have been a Guarani people, although Moreno and others regard them as the probable ancestors of the Puel-che, since driven farther inland.

Between the civilised Calchaquis and the Guarani the plains were occupied by nomad groups, presenting no kind of national cohesion, but resembling each other in their usages, warlike character, and often also in speech. Many doubtless belonged to a common stock, which in the absence of any collective name might be called the Toba race, from the most powerful nation by whom they are now represented.

Farther south the terminal peninsula of the Continent was occupied by the Araucanians and Patagonians, who constitute a sub-race very distinct from the northern Indians. Lastly, the eastern section of Fuegia is still roamed by a few Onas, who are Patagonian intruders from the mainland.

With the arrival of the Europeans began the massacres and steady extermination of the aborigines under diverse pretexts. Some were distributed in the so-called *encomiendas* for their "spiritual welfare," while others were simply enslaved, or else classed as *mitayos*, "hirelings." But the result was the same, and whole groups disappeared in the mines or died out on the plantations. Those gathered by the Jesuits into their reductions increased in peaceful times and in healthy years, but only to be eventually swept away by the Mamelucos and epidemics. Most of the missions have disappeared with all their inhabitants, either extirpated or assimilated to the surrounding Hispano-American mixed populations.

This process of assimilation has been extended to the north-western Calchaquis, to the Guarani of Corrientes, to the agricultural Indians of Tucuman, Santiago del Estero, San Luis, and Cordoba. The Comachigones of the Central province, the Michilengues of San Luis, the Giyones and Calingastas of Mendoza, having lost their Indian names and speech, fancy themselves full-blood Spaniards. In usages, language, and political life they have become gradually assimilated to the other Argentine populations.

On the other hand, the wild Indians themselves, who have never ceased to kidnap the women and children of their white neighbours, belong in great measure, at least in blood, to the race of the conquerors. But the racial struggle is still carried on, fierce and brutal as ever, between the Argentines and the warlike Toba tribes of the northern plains. In the south the rapid decrease of the Pampean aborigines has at last put an end to the border warfare, which had till recently been waged with relentless cruelty on both sides. Possibly Spanish influence had rendered these natives more savage than they had been originally. At least a bad effect could not fail to be produced by the servitude of the civilised tribes, and by the introduction of the horse and of firearms, which naturally gave a stimulus to the inborn taste for rapine and plunder.

Little has been heard in Europe of these border troubles; but the horrors and atrocities that were associated with the sudden raids of the Pampas Indians almost pass the limits of credibility. "It is now but twelve years," writes

Mr. Knight in 1834, "since the Indians made a raid here [Cañada de Gomez], and carried away 10,000 head of cattle and many women, for the aboriginal has the good taste to prefer the white to the dusky beauties of his own race. But the camps of the white men have advanced many leagues farther into the Indian territory since that time, and Cañada de Gomez has little to fear now.

"A raid of Pampas Indians is no joke. As the peaceful stock-farmer is scanning his herd some fine morning, he perceives a dust on the horizon, and out of the dust soon comes on at a tremendous gallop the wild troop of naked men on splendid horses, seeming one with their steeds—very centaurs, with long black hair waving behind their shoulders, and brandishing their long lances, while they raise their piercing and fearful war-cries. The estancia is pillaged in a few moments, the wife and daughters of the estanciero carried off, and then, swooping down on the herds, the savages drive them away to the distant pastures by far rivers that the white man knows not of. When Indians on expeditions of this nature come across a solitary white man, they kill him if they find arms upon him. If he be unarmed, they treat him more mercifully. They content themselves with cutting off the soles of his feet, and let him go."* It may be remembered that the Persian victims of the Turkoman *alamans* often met with similar treatment at the hands of the people of Khiva, before their marauding expeditions were suppressed by the Russians.

THE CALCHAQUI AND CHIRIHUANAS.

The descendants of the Quichuas in the province of Jujuy bear the general name of Coyos, or Coyas. Although all understand Spanish they have preserved their mother tongue and national usages. Many migrate periodically to the plains as itinerant pedlars, but, like the Bolivian Collahuayas, nearly always return to their mountain homes.

In the extensive region between the North Chilian frontier and the Cordoba uplands, formerly occupied by the Calchaquis, few traces now remain of that powerful nation except their characteristic black and red pottery of diverse forms with geometrical designs in straight lines, and on the sepulchral urns symbolic and animal figures. For over a century these Indians successfully resisted the Spaniards, and even attempted to restore the Inca dynasty; but they were finally overthrown in 1664, when most of the combatants preferred death to bondage. The Quilme group was removed in 1677 to the suburban quarter of Buenos Ayres, which still bears their name, and where the last of the race died in 1869. But the half-caste descendants of the Calchaquis constitute the substratum of the industrious populations in the provinces of Jujuy, Salta, Catamarca, and La Rioja. Most of the towns and villages, especially in the upland valleys, perpetuate the

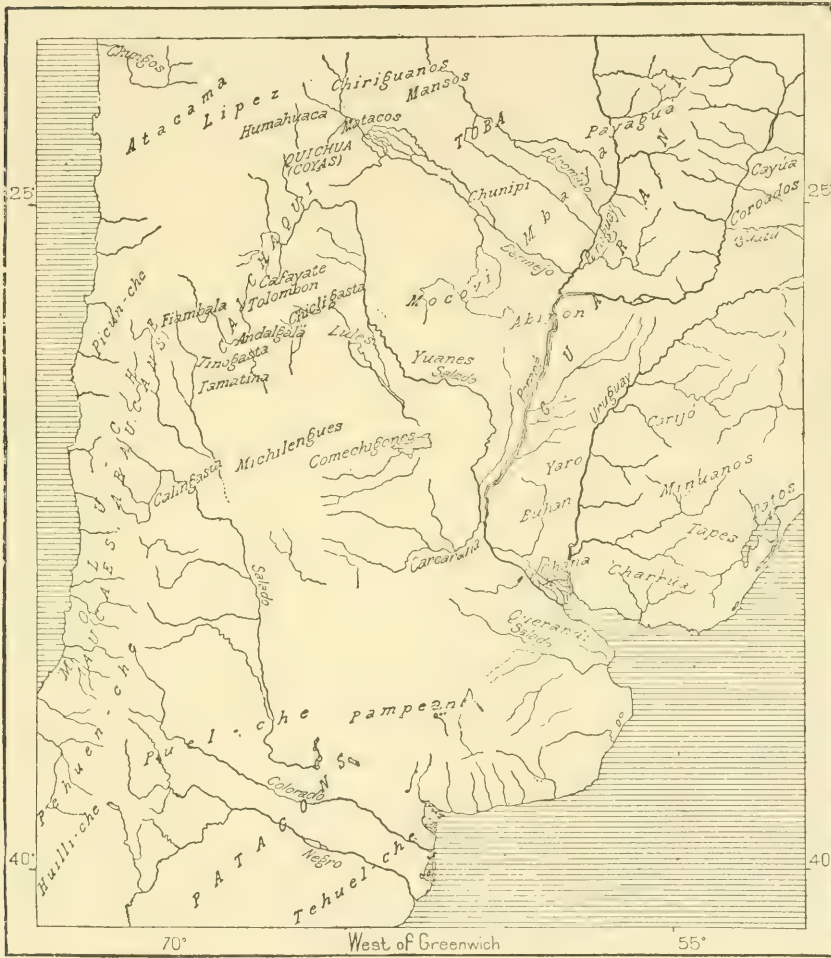
* *Cruise of the Falcon*, i., p. 144.

names of assimilated Calchaqui tribes, such as the Andalaga, Tolombon, Cafayate, Fiambala, Tinogasta, and Famatina. Tucuman is also a modified Calchaqui name.

All the northern part of the Argentine Mesopotamia is still occupied by populations of undoubted Guarani descent, although the tribal names have dis-

Fig. 163.—INDIAN POPULATIONS OF NORTH ARGENTINA.

Scale 1 : 19,000,000.



appeared, and the Spanish language is steadily spreading from all the urban centres. The Chirihuanas (Chiriguano), who are nearly pure Guarani from the Bolivian province of Tarija, occupy parts of Chaco, where they seek employment on the sugar plantations of the Bermejo and Juramento valleys. Their Guarani dialect differs little from that of Paraguay; but at present most of these semi-independent Chiriguano speak Spanish.

THE MATACOS AND ABIPONS.

Associated with them on the sugar plantations are the Matacos, a branch of the independent Mataguayos, who appear to be of Toba stock. They are smaller, more thick-set, and stronger, but also less skilful and enterprising than the Chiriguanos. The uncivilised branch have the curious custom of wearing, suspended from the shoulders, a satchel in which are kept odds and ends of all sorts, arrowheads, fish scales, hair, feathers, dry leaves, blood-stained rags, which make up the "history" of the bearer, each object representing some event in his life, and, therefore, carefully preserved as part of himself till his death. The Matacos, who are estimated at about 14,000, practise the *couvade*. They are of shorter stature than the Tobas, but more robust and strongly built, with thick neck, well-developed muscles, stout limbs, broad, flat features, and high cheek-bones, the upper jaw being deeply arched like a horseshoe. "The nose is broad, straight, not very prominent, and with wide nostrils, but it is not flattened. Indeed, they are seriously afraid of having flat noses, so much so that they will not eat mutton, which is supposed by them to cause flatness in that feature. This is a device of their medicine-men and soothsayers, in order to prevent the destruction of their few sheep and also the consequent loss of the wool, which they weave and make use of in many ways.

"The adults have black or blackish hair; in the old it is sometimes, but rarely, white, possibly because very few attain to old age. The children up to ten or twelve years have reddish hair; a curious fact recalling the theory of De Salles, according to which primitive man was red-haired. The hair is generally worn long and unkempt, but during periods of mourning it is cut off for a year. The skin of all these Indians varies in colour from copper to clay, while occasionally some are spotted with black." *

Like most of the other uncivilised tribes of Gran Chaco, the Matacos are unable to count beyond four, and even to accomplish this mental operation they have recourse to the four fingers of the right hand, the thumb being held in the left; beyond four everything is *ntocq*, "many." Thus a noted Mataco chief had some difficulty to explain to his interviewer, Pelleschi, that in his time he had slain a large number of hostile Indians. After telling off the first four he got puzzled, and "sitting down cross-legged on the ground, he began making marks on the earth with his finger, exclaiming at each one *toch*, i.e., 'this,' raising his head each time as well as his hand, and looking at me, added *uuidt toch*, meaning 'and this one too'; and so he went on until he reached about a score, always, however, turning towards me that I might understand that, besides these, there were always the four fingers, until at last I was almost tired out with *ntocq*, *ntocq*, 'many, many.' " †

In Argentina the fierce and till recently powerful Abipons are now represented only by a few half-caste families of Spanish speech in the Santa Fé district. The kindred Mocovi, or Mbocovi, alternately their allies and deadly foes, still retain

* Pelleschi, p. 33.

† Pelleschi, p. 289.

their tribal organisation, although greatly reduced in numbers, perhaps more by small-pox than by war. But they have been recruited by refugees of all races, horse-stealers, murderers, brigands, and others obliged to fly from the white settlements.

These Mocovi, usually called *Indios Montaraces*, "Forest Indians," formerly committed terrible depredations, destroying villages, wasting the plantations in Tucuman and the neighbouring provinces, and long preventing the whites from access to Chaco. Their nasal and guttural language is a dialect of the Abipon, which, according to Lafone y Quevedo, is "a branch of the great Carib family." Thus the powerful Carib race, whom the first European navigators found spread over many of the West Indian islands, but whose original home appears to be Central Brazil, would seem to have ranged southwards as far as the foot of the Argentine Cordilleras.*

THE PAMPAS INDIANS.

South of the settled provinces, in which all the indigenous groups have been obliterated as distinct elements, the southern regions of the pampas, together with the whole of Patagonia, belonged till recently to the free Indians, collectively classed as "Pampeans," Araucanians, and Patagonians. After the first conflicts with the Spaniards, these aborigines were driven south, and long remained at peace with the whites. They possessed neither gold nor silver, nor much agricultural wealth; they were left to their grassy and stony solitudes.

Meantime the Indians had received, in the horse introduced by the whites, a valuable ally, useful in battle, in the chase, and even as food, failing the guanaco, ostrich, armadillo, and other game. They became great riders, and during their long warlike or migratory expeditions the Ranqueles and Pampeans of the Buenos Ayres district never quitted the saddle. When worn out by fatigue they stretched themselves on the animal as on a bed, and slept for hours in this position without ever losing their balance. Such was the intelligence of the horse that he instinctively adapted all his movements to those of his inert burden. We are even assured that the Indian could die on his horse. During the frontier wars instances were recorded of dead warriors being found and removed with difficulty from the horse that carried him out of the fight, and about whose neck his rigid fingers were clasped in death.†

Then they learnt to trade in this live-stock with the Chilians over the mountains, receiving in exchange arms and other implements. And if the herds fell short, they could be renewed by raiding the whites, by taking the animals from those who had taken their lands. Hence those incursions (*malon*, *maloca*) which the squatters on the frontiers justly dreaded, and which were renewed from year to year all along the borders between Buenos Ayres and Mendoza. Thus was

* *Revista del Museo de La Plata*, 1890—1891.

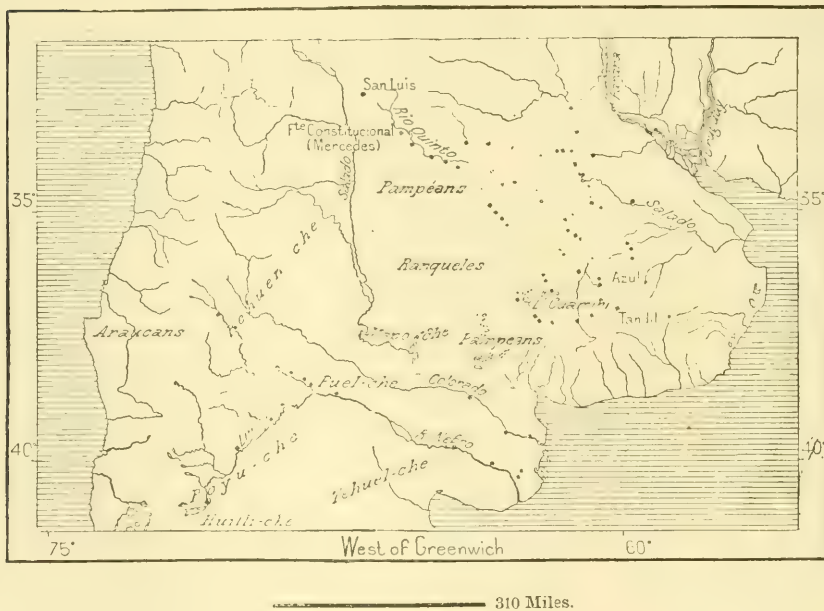
† *The Naturalist in La Plata*, p. 355.

gradually brought about a chronic state of fierce warfare, in which no quarter was given on either side. When a camp or a village was surprised, all the men were slaughtered, at times even tortured, the women being reserved as slaves or concubines, the children either killed or kept as thralls about the farmsteads.

To protect the outlying settlements from these incursions, it was found necessary to lay down various frontier lines at different periods, and to defend them with forts and earthworks. At the close of the eighteenth century the limit of the area of colonisation was indicated south of Buenos Ayres by the Rio Salado Valley, and extended westwards about the thirty-fourth parallel as far as San Rafael at the foot of the Andes. But the Indians took advantage of the War of Indepen-

Fig. 164.—LINES OF OUTPOSTS AGAINST THE INDIANS.

Scale 1 : 17,000,000.



dence to break through this cordon. In 1833, however, they were driven south of the Rio Negro into Patagonia proper, and several of the tribes asked for peace. Then the civil wars gave the natives a fresh respite, and even enabled them to renew their incursions as allies of one or other of the factions. Thus they several times occupied the city of San Luis, and blocked the main route between Chili, Mendoza, and Buenos Ayres.

On the restoration of peace the Indians, steadily diminishing in numbers, were again driven back, and then the fortified lines were drawn more sinuously from the Rio Colorado, south of Bahia Blanca, northwards to cover the cultivated regions of Buenos Ayres, and from post to post north-westwards to San Luis, here bending round south-westwards in the direction of San Rafael and the Planchon

Pass. This frontier was divided into nine sections, each defended by a fortified central camp held by a strong garrison. In 1876 a general forward movement advanced the line in such a way as to efface all its curves, thus greatly reducing its length, and annexing the native trysting grounds.

This new chain of forts, extended along the eastern slopes of the Andes, made all further resistance impossible, and nothing remained for the survivors except to submit. But meantime the Pampeans had disappeared, and even the Patagonians are dying out, having fallen from about 30,000 before the border wars to no more than 2,000 in 1893. The loss, however, can scarcely be regretted, for long before their final reduction the Pampas Indians had been transformed to mere predatory hordes, depending for their very existence on cattle-lifting raids amongst the white settlers. "Even those who, like the more distant Pehuenches, were of Araucanian origin, had sadly degenerated from the formidable warriors sung by Ercilla. They had lost all the bolder traditions of savage warfare, and had sunk to the level of mere marauders, though their inborn ferocity too frequently showed itself in cowardly murders committed on the defenceless. Unfortunately their *tolderias*, or encampments, served as a refuge to the more lawless elements among the native Argentines or Gauchos, and they were often led, as well as instructed in the use of firearms, by deserters and criminals flying from justice.

"Still, considering the paucity of their numbers and the pooriness of their armament, it seems almost a national disgrace that they should have been allowed to hold their own so long, and, indeed, to derive tribute, as they did, from the treasures of civilised communities like Santa Fé or Buenos Ayres. It is the more surprising because, like their kinsmen in North America, they were an expiring race, and at the time of their final overthrow had been reduced to a state of semi-starvation by the iron barrier of the frontier, which put an end to cattle-lifting on a large scale, and prevented their replenishing the herds of horses which alone made them formidable.

"The internal dissensions, which so long distracted the Confederation and paralysed its energies, must account for the lack of vigour shown towards these intolerable savages, and the radical manner in which they have now been dealt with is a happy augury that this country has at last reached the era of stable, well-ordered government." *

Of the Pampeans the Ranqueles (Ranqual-che) were nearest to the Buenos Ayres colonies, being followed southwards by the Puel-che of the Rio Colorado, and westwards in the province of Mendoza by the numerous Araucanian tribes, whose names terminate in the syllable *che*, meaning "people." Such were the Pehuen-che, Huilli-che, Payu-che, Tami-che, Pilma-che, Teghul-che, following in their order along the chain of the Andes. The Molu-che occupied the central regions, while the Tehuel-che, that is, "People of the East," roamed the Atlantic coastlands from Magellan Strait to the Rio Chubut, and ranged into Fuegia under the name of Onas.

* Rumbold, *op. cit.*, p. 76.

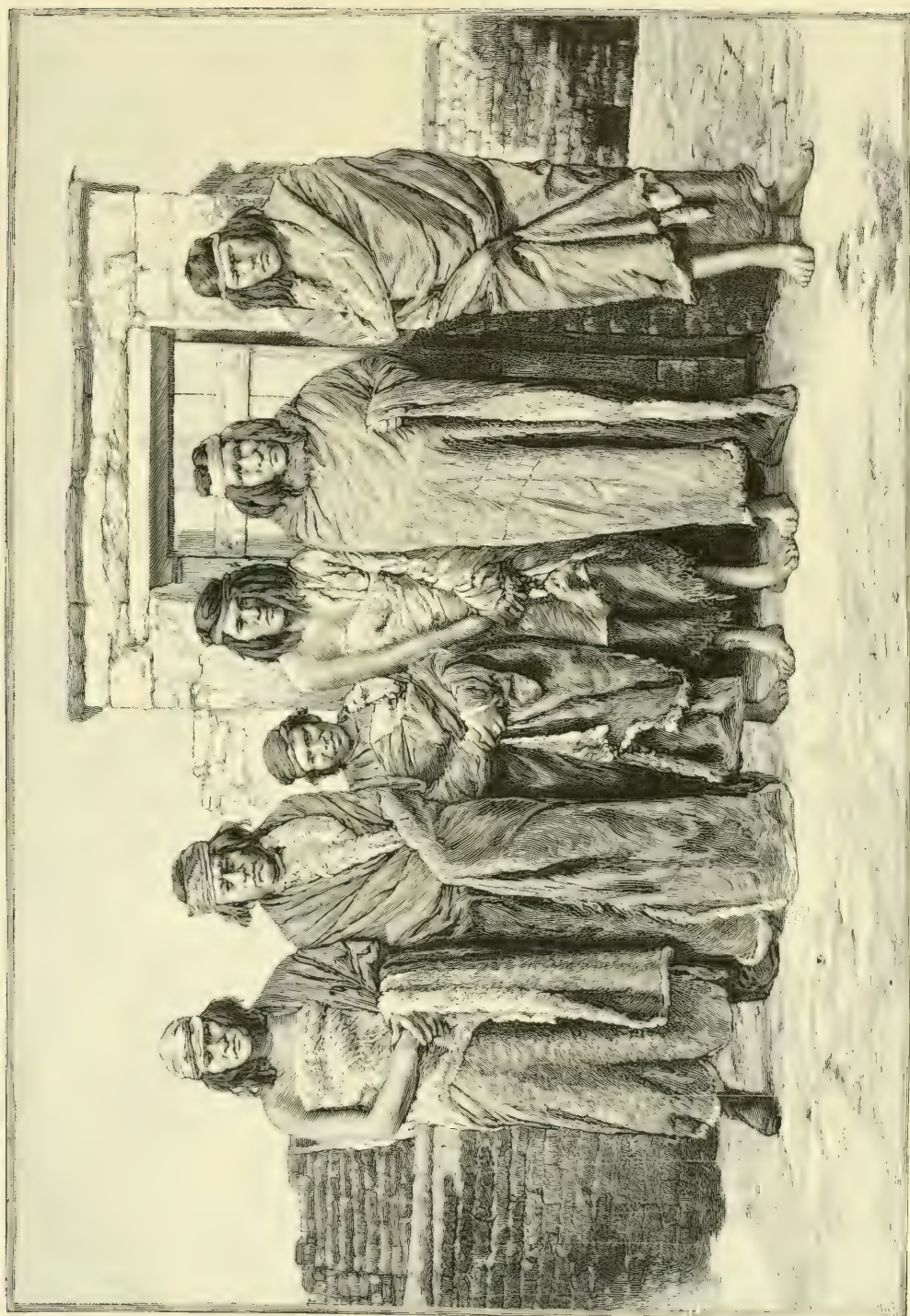
THE PATAGONIANS.

The Tehuel-che probably descend from the "Patagonians" met by Magellan and described by Pigafetta. They are still the most numerous of these groups, and they have best preserved their cohesion as a distinct nation. The term *Patagones*, "Big Feet," is a misnomer, for they have in fact rather small feet (averaging less than 11 inches) compared to their colossal stature of about 6 feet 4 inches. In very cold weather they often wear over their boots a kind of gaiter made of guanaco skin, and this may perhaps have given the feet a disproportionately large appearance, though Pigafetta's words are: "The guanaco skin gives their feet the appearance of bears' claws." As to the giants "ten or twelve feet high" reported by Byron, Sarmiento and others, they were probably not taller than the present Patagonians, who, however, are undoubtedly the tallest race in the world.

At Carmen de Patagones, where the Tehuel-che are already crossed with the Pampas Indians, and consequently fall below the average stature of the race, d'Orbigny found that the men had a mean height of 5 feet 9 or 10 inches. Since that time nearly all explorers, who have traversed the country or even merely visited the coast-lands, have also taken regular measurements of the stature of the aborigines. A comparative table of these measurements shows that the full-blood natives of the interior are the tallest, averaging about 6 feet 3 or 4 inches in the Upper Rio Chico Valley. The women also are very tall, and the guanaco skin, which constitutes their ordinary costume, contributes to give them a still more majestic appearance.

The Tehuel-che are also noted for their broad shoulders, fine muscular development, and stately bearing. The eyes are small, the nose short, the face round, with a somewhat pleading expression. The Tehuel-che language is very harsh, guttural, and difficult to express with European letters, as shown by the extraordinary discrepancies in the spelling of words collected by different travellers. It also changes rapidly owing to the custom of avoiding sounds that might recall the name of any departed friend, such sounds having to be replaced by fresh expressions. The three dialects—Tehuel-che, Araucanian and Pampean—differ so greatly that the kindred peoples were unable to converse together.

Nevertheless they possess a simple and very complete decimal system of numeration, which is absolutely identical in all three dialects. This feature might at first sight seem to connect the Patagonian speech with that of the Peruvian linguistic family. But it could never establish any fundamental relationship, and, taken by itself, would point at most to the civilising influence formerly exercised by the Quichea nation far beyond the actual political frontiers of the Peruvian empire. The Patagonians themselves have no historic traditions, and their oral records go no farther back than the period when they came into contact with the European settlers. They cannot even imagine a time when their ancestors lived without a knowledge of the horse, an animal which now appears so necessary to their very existence.



GROUP OF PATAGONIANS.

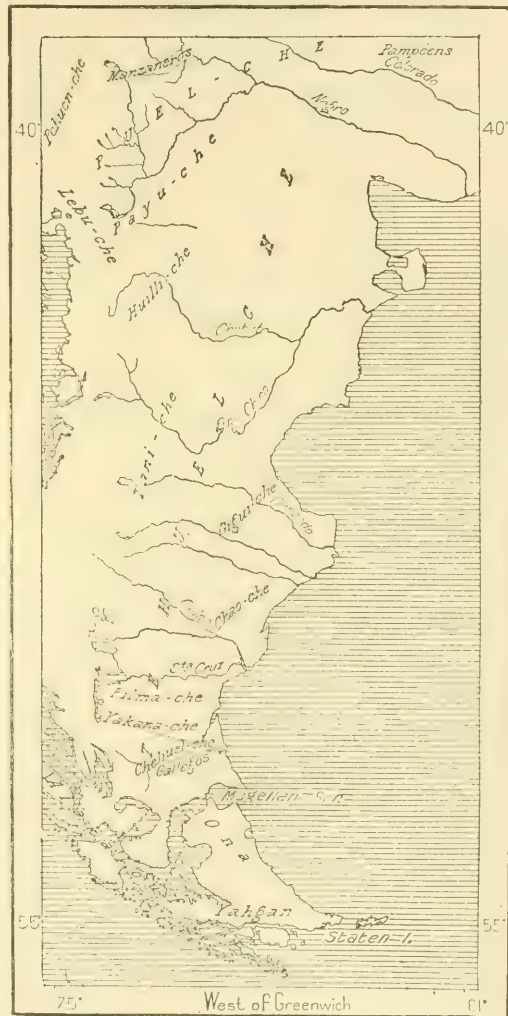
All the Patagonians have for several years lived in complete subjection to the Argentine authorities. They even call themselves Christians; but despite their apparent physical strength they are often decimated by epidemics. Although generally sober, they indulge in drunken orgies on all festive occasions, and these degrading scenes sometimes last for weeks together. At such times the women carefully collect all dangerous implements, knives, clubs, lassos, and hide them away in some remote gorge, where they take refuge with the children till the bout is over.

For the most part the Tehuelche Indians are dying out without passing through the period of servitude. These aborigines still preserve their haughty spirit, freely roaming their dreary solitudes from north to south, from the foot of the Andes to the shores of the Atlantic. They wear their flowing locks bound round the head with a broad bandage, like that which is used to compress the skull to the required shape in infancy. Like so many other primitive peoples, they carefully pluck out all hairs from the face, and till recently employed for this purpose small silver tweezers identical with those that have been found in the old sepulchral mounds of the Calchaqui Indians in the province of Catamarca.* But in their present impoverished state they have generally to rest satisfied with simple knives with which all sprouting hairs are shaved off.

Since their submission to the Argentine Government, the Patagonians have been obliged to renounce all warlike expeditions. Consequently they no longer go about armed with the national spear and cowhide buckler embellished with metal ornaments. At present their only weapon is the *bola perdida*, "lost

Fig. 165.—INDIAN POPULATIONS OF SOUTH ARGENTINA.

Scale 1 : 16,000,000.



* Francisco P. Moreno, *Viaje à la Patagonia Austral*.

bola," which they cover with leather and keep attached to the waist. "This characteristic missile is of two kinds: the simplest, which is chiefly used for catching ostriches, consists of two round stones, covered with leather and united by a thin plaited thong about eight feet long. The other kind differs only in having three balls united by the thongs to a common centre. The Gaucho holds the smallest of the three in his hand, and whirls the other two round and round his head; then, taking aim, sends them like chain-shot revolving through the air. The balls no sooner strike any object than, winding round it, they cross each other and become firmly hitched.

"The size and weight of the balls vary according to the purpose for which they are made. When of stone, although not larger than an apple, they are sent with such force as sometimes to break the leg even of a horse. I have seen the balls made of wood, and as large as a turnip, for the sake of catching these animals without injuring them. The balls are sometimes made of iron, and these can be hurled to the greatest distance. The main difficulty in using either lazo or bolas is to ride so well as to be able at full speed, and while suddenly turning about, to whirl them so steadily round the head as to take aim; on foot any person would soon learn the art."*

Some of the Patagonians still wear little silver bells suspended from the waist; all paint themselves in red, white, and deep blue, both for show and also for the practical purpose of protecting the exposed parts of the body from the action of the wind and from mosquitoes. Their only musical instrument is a sort of flute made of the bone of a huanaco.

Under new forms the old beliefs still persist. Sun and moon retain their beneficent qualities as good spirits, while noxious influences are diffused by certain animals such as the lizard, which have to be conjured by the sacrifice of living beings, especially the horse. Probably through fear of similar baneful results several of the Tehuel-che tribes will on no account eat fish. The women secrete little figures, regarded perhaps as amulets or household gods, and the medicine-men still continue, as in pagan times, to exorcise their patients, to summon or scare away the demons.

These *payé*, as the medicine-men are called by a name differing but slightly from that current in the Amazonian and Guiana regions, have also the right of interpreting at their pleasure all natural phenomena and incidents of all kinds. Thus a long-established belief based on such interpretations assigns to the *gaulichus*, or demons, the bodies of old women, as their ordinary dwelling-place. Hence everyone had a right to kill any aged females crossing his path, and till recently this right was frequently exercised. In order to escape from such a fate most of the cronies attempted to render some service to the community in the character of prophetesses announcing good tidings. But woe to those whose forecastings turned out unfortunate.

In certain cases custom even required the Tehuel-che to sacrifice some aged

* Charles Darwin, *Voyage Round the World*, ch. iii.

relative, slave, or mistress. On the death of any young person in the *toldo*, or tent, the head of the family had to secretly remove the appointed victim far from the camp, and despatch her with a knife. This duty was sternly exacted, especially in the case of mothers-in-law. Hence, in anticipation of such a tragic end, the parents of the bride were careful to live apart from the son-in-law, never coming in contact or holding any intercourse with him. A similar custom is known to prevail amongst the Papuans, the Australians, the Zulu-Kaffirs of South Africa, and many other primitive peoples. In these communities mother-in-law and son-in-law take every precaution to avoid each other's sight, and the explanation of the feeling is probably afforded by the Patagonian custom. Orphans, on the other hand, are well looked after; they are the wards of the whole tribe, and their property is administered with perfect honesty. Married people without children often solemnly adopt a little dog, setting apart for his maintenance a number of horses, as would be done in the case of a son and heir.

Marriages are always freely contracted without the intervention of the parents on either side. But, like burials, they afford a pretext for sacrifices. On such occasions several mares are killed, and the blood drunk as it flows from the wounds. But during the present generation no instances have occurred of human sacrifices. On the other hand, when a man goes into mourning for the loss of a wife, he burns all he possesses. The dead are sewn up in a poncho and buried either in the recesses of a cave or under a heap of stones like the cairns raised over the graves of the old Gaulish chiefs. They are always deposited in a sitting posture, like that of the Peruvian mummies, and like the bodies of the pre-historic inhabitants of Patagonia.

So recently as the year 1860 the Tehuel-che still sewed up the bodies of the dead in a fresh leather sack. If the sick person happened to be advanced in years, his friends did not wait for his death, fearing that the *rigor mortis* might render the operation impossible. An old woman, charged with the funeral arrangements, sat upon the chest of the victim, drew the legs by sheer force up to the trunk at the risk of breaking them, and then fastened the hands to the tibias. The pack, well corded, was then exposed to the sun, and when sufficiently dried, stowed away in the sands of the dunes. Such was the force of habit or tradition, gradually transformed to a pious duty, that, in order to bury the dead in accordance with the prescribed forms, they were killed by breaking their bones.* Such a practice forcibly recalls the Procrustean process of legendary Greek history, which may have possibly been a reminiscence of analogous usages in savage times.

THE GAUCHOS.

Till recently the Argentine of the rural districts, undoubtedly descended on the mother's side from the aborigines, scarcely differed in his social usages from

* Moreno, *op. cit.*

the Indians themselves. Even physically he resembled them in his tall stature, robust frame, swarthy complexion, strongly-marked features, coarse black hair. His life in the saddle had made him bandy-legged with feet turned inward, and a heavy rolling gait when walking. Like his Araucanian foe, the *Gaucha* feared no danger, possessed prodigious power of endurance, and was careless of life. He despised manual labour, leaving it mostly to the women, and, if he occasionally consented to lend a hand it was done with a haughty, contemptuous air, "such as becomes a gentleman." He even trained his horse to do his work, to tread out the corn, knead the potters' clay, churn the butter.

Of sordid habits, and housing in wretched hovels, the *Gaucha* was nevertheless vain of his finery, guanaco wool mantle, embroidered pantaloons, silver spurs, plumed hat. No less splendidly comparisoned was his horse, whose affection he never gained, and whom he was ready at any moment to stake on a throw of the dice. Cock-fighting, racing, pot-house orgies, wars, and bloodshed, such were his ruling passions. Hence, in the struggle for existence, the *Gaucha* has gradually been outstripped. As he got the better of the Indian, he has in his turn been supplanted by the *gringo*, that is, the foreign immigrant supposed to speak "griego" (Greek). The last genuine *Gauchos* were the *Llanistas*, of La Rioja, at first retainers of two lordly families, then during the civil wars grouped round the truculent chief, Facundo Quiroga, with their dreaded banner: "Religion or Death!"

A gloomy picture is drawn by those who knew them best of the domestic and social relations of the Argentine *Gauchos*. "It may be said that among the unlovely homes of the peasantry of most countries none perhaps is more dreary or repulsive than that of the *Gaucha*—if home it can be properly called, having, in most cases, for its basis an illicit union with a poor creature devoid of all feminine charm or grace, and steeped in utter ignorance and slovenliness. The typical *Gaucha* woman, in fact, has little of her sex beyond her untidy garments and sharp tongue; and but for the powers of endurance, which enable her on occasion to vie with the men in the hardest work, such as sheep-shearing or cattle-driving, and a certain rough fidelity that makes her stick to the chance partner with whom, after many a previous experience, she has finally mated for good, she has no redeeming qualities. Of things above these she has neither knowledge nor instinct, and it is no wonder, therefore, if her companion is driven from her cheerless society by sheer *ennui* to seek a solace elsewhere in drink and debauchery.

"It is difficult to say who is to come to the rescue of these hot-blooded, untutored men, who, for all their vices, attract sympathy by their fearless bearing and a certain native dignity and courtesy. The priest has never had any hold on their dark heathenish homes, for the pure *Gaucha* has but the faintest tinge of Christianity, his religion being made up of childish and degrading superstitions, mainly derived from Indian sources. The schoolmaster so far has hardly reached him, and he has yet to be redeemed if he is to be worked up into a useful element in the new fabric of civilisation that is growing



GROUP OF GAUCHOS.

up around him, The national government have an arduous task before them in this direction.” *

THE SPANIARDS AND OTHER EUROPEAN SETTLERS.

Even during the early migrations the white intruders in the Platean regions were already a strongly mixed race, and interminglings are still going on to a greater extent than in any other land. Certain Arab words which have become obsolete in Spanish reappear in the language of the Argentines. Such are *jaguel*, a well flush with the surface; *guadal*, a quagmire, and other terms referring for the most part to life in the wilderness. Some family names, also, such as *Albarracin*, which have disappeared in Spain, are still met on the Argentine plains. From these examples it would seem probable that during the first period of colonisation the converted Christians of Moorish stock, still harassed by the minions of the Inquisition, emigrated in relatively larger numbers than those of the old Spanish race.

But however this may be, all non-Spanish elements except the negro slaves were rigorously excluded from the country before the War of Independence, and it is only since 1821 that foreign immigration has been encouraged by the Argentine Government. By a treaty concluded with England in 1825, the country was formally thrown open to settlers of all nationalities.

The first to avail themselves of the privilege were the Basques, those of the French Pyrenees as well as those of the Iberian provinces. At Monte Video, Buenos Ayres, and all the inland towns along the banks of the Uruguay and Parana rivers, these Basques found employment as stevedores, gardeners, brick-makers, tanners, overseers on the estancias or at the saladeros; in a word, in all pursuits demanding skill, strength, and endurance. In many localities they were grouped in colonies sufficiently populous to preserve the use of their mother tongue, at least for some time. Although they have now for the most part adopted the Spanish language, the multitude of Basque names, recurring in every part of Argentina more frequently than in any of the other Hispano-American Republics, shows the great importance taken by this ethnical element in the formation of the Argentine people. Even Indian chiefs bear Basque names, and tradition still preserves the memory of the exploits performed by the Pampean captain, Baigorrita.

RECENT IMMIGRANTS.

The material progress made by Argentina may be gauged by the development of the immigration movement. Not a single European nation but has its representatives in this vast Babel of the New World. The French, English, and Germans have settled especially in the large cities, where they control the

* Rumbold, *op. cit.*, p. 91.

industries, and promote most of the local enterprises. The Italians have monopolised the fluvial navigation, and are rapidly increasing in numbers, crowding out all rivals and taking a leading part in all departments of national activity.

A stream of Irish immigration, now nearly run dry, flowed in some decades ago, and became associated more intimately than the English with the general population, especially in field operations and about the docks and shipyards. The agricultural colonies of Santa Fé were chiefly founded by Swiss, German, and French peasants, while Russians and Russified Germans form the majority of the rural settlers in Entre-Rios on the banks of the Parana. The Welsh have formed a separate group in the remote region of the Chubut Valley. Even Australia has begun to take part in the movement, and in 1893 several hundreds from this region obtained concessions along the banks of the Rio Negro. Since 1891 thousands of Jews, expelled or refugees from Russia, have found an asylum in the Argentine lands, where they have hitherto kept aloof from the other elements of the population. Thousands of Chilians swarm into the western provinces, and are rapidly peopling the Cuyo, as the Andean slopes are called. Bolivians, Paraguayans, and Brazilians also form a considerable section of the northern and eastern settlements. But types indicating a strain of African blood are rare, although in 1778 people of colour formed about one-third of the whole population.

It would appear from a Parliamentary paper issued in 1894 by the British Foreign Office on Baron Hirsch's recent Jewish Colonisation scheme, that none of these foreigners succeed better than the Jewish refugees from Russia. At the end of the year 1893 these already numbered considerably over 6,000, most of them being drawn from the provinces of Southern Russia. The extent of lands bought for them is 63 square leagues, of which about one-third is colonized at an expenditure so far of nearly £440,000. The present condition of the colonies is described as decidedly prosperous. The area under crops is large, wheat alone covering over 17,000 acres. Thoroughly practical men have been engaged in carrying out the scheme, with the result that the settlers have now a good harvest before them, and are likely to realise good profits. There is a central committee in St. Petersburg, with branches all over Russia, who select the most deserving Jews recommended to their notice for emigration.

After a colony has been properly organised, local self-government is introduced. A council with several members is appointed, of which two or three, according to the size of the settlement, are chosen by election from among the colonists themselves, and one is the resident controller named by the association. This council, which meets daily, regulates the distribution of machines, transport, building, public health, and the difficult question of meat. The duty of the controller is to look after the property of the association, to distribute the food subsidies to each family, to act as its legal representative in all dealings with the local authorities and private persons, and later to collect the debts due by the colonists to the association.

TOPOGRAPHY—TOWNS OF THE MISSIONS TERRITORY.

Like the United States and other regions where trade and population are rapidly increasing, the Argentine Republic is distinguished by a marked preponderance of urban groups, and by a general tendency of the people to gravitate towards the large towns. Buenos Ayres, capital of the State, contains over one-eighth of the whole population, while vast inland regions far from the Atlantic ports remain almost uninhabited.

In the territory of the Argentine "Missions" the former reductions, or settlements of converted Indians, have been transformed to rural villages with widely scattered dwellings, while most of the ruined churches have supplied the materials for modern structures. The Brazilians, who form the majority of the settlers in this region, have established sugar-works and factories for the preparation of manioc and maté.

On the right bank of the Uruguay, where till recently the ruins of the Missions covered a space of nearly 150 acres planted with palm and orange groves, the town of *Concepcion* has become a busy agricultural centre surrounded by a broad belt of "black" tobacco fields. Farther on the village of *Santo Tomé*, also an old Jesuit foundation on the same side of the river, exports much rice. *San Martin* (the *Yapeyu* of the Guarani), birthplace of the revolutionary hero bearing this name, is now a mere hamlet, although for many years the headquarters of the Missions, the "Rome" of the great theocratic Republic.

Libres—*Paso de los Libres*, formerly *Restauracion*—where the "freemen" crossed the river to rescue their country from the tyranny of Rosas, stands over against Uruguayana, on the Uruguay side, with which it practically forms a single town. A little farther south is the old mission where Aimé Bonpland passed the last twenty years of his life, and where he died in 1857.

Lower down *Monte Caseros*, an important cattle market, faces the Uruguayan town of Santa Rosa. At this point the railway constructed along the left bank of the Uruguay throws off to the north-west a branch which is soon to be completed through *Mercedes* to Corrientes, capital of the province of like name.

CONCORDIA—LORETO—ITATI.

Southwards follow the modern settlements of *Mocoreta*, *Libertad*, founded by Tyrolese peasants, *Federacion* and *Concordia*, the last-mentioned facing the Uruguayan city of Salto. Although one of the busiest riverside ports of Argentina, it is accessible to large steamers only during the floods. Even *Colon*, over 60 miles farther south, is approached with difficulty at low water. *Colon*, which dates from 1863, faces Paysandu on the Uruguay side, and serves as the outlet for the agricultural produce of *San José*. This colony, established in 1857 by some Swiss and Savoy immigrants, has prospered wonderfully, and from this "mother hive" have issued numerous swarms, which have gradually transformed the whole face of the land. Wheat, with which a beginning was made, has been

successively replaced by orchards, and by vineyards which yield a coarse wine infinitely preferable to the horrible concoctions sold in Argentina as "claret." Poultry farming also succeeds well in the San José settlement.

Vessels drawing over 20 feet stop below Colon at the landing-stage of *Concepcion del Uruguay*, former capital of the province, which stands on a lateral creek communicating by rail with the main stream. *Caseros*, west of Concepcion, is one of the most flourishing offshoots of San José.

Guauguaychu, on the right bank of the shallow river of like name, is visited by numerous vessels of light draught, which here ship cattle, provisions, hides, and other farm produce. Founded at the close of the eighteenth century, *Guauguaychu* has become the third port of the Republic, and the largest and wealthiest city in the province of Entre-Rios. It has far outstripped its former rival, *Guauguay*, which lies some 60 miles farther west on the river *Guauguay*. This place is connected by rail with *Tala*, central station of the province, and with the industrious settlement of *Villaquay*, where the Belgians are in a majority. A branch line runs through *Nogoya* and its cattle farms to the port of *Victoria* on a lateral creek of the Parana.

On the Parana the Argentine stations above Corrientes are for the most part villages founded by the missionaries. Such are *Candelaria*, at one time residence of the Jesuit directors, and *Posadas*, which has displaced Yapeyu as capital of the present administrative division of the Missions. *Posadas*, which from 1822 to the death of Francia was the only free port of entry for the traffic of Paraguay with Argentina, has continued to flourish despite the loss of its monopoly.

Nearly all the stations which follow as far as the Paraguay confluence recall some events in the local wars and predatory expeditions. The *tranquera* ("trench") of *San Miguel*, and lower down that of *Loreto*, were dug to protect the territory of the Jesuits against the incursions of the Corrientinos, and on the former Francia erected a fort in 1822. *Itati*, near the Paraguay confluence, dating from the beginning of the seventeenth century, lies near the defensive works so stubbornly defended by the Paraguayans against the allies. The inhabitants of *Itati* are of nearly pure Guarani stock, although they have become half assimilated to the Hispano-Americans in speech. They still practise the traditional industries of weaving and pottery, for which the Guarani people were always famous.

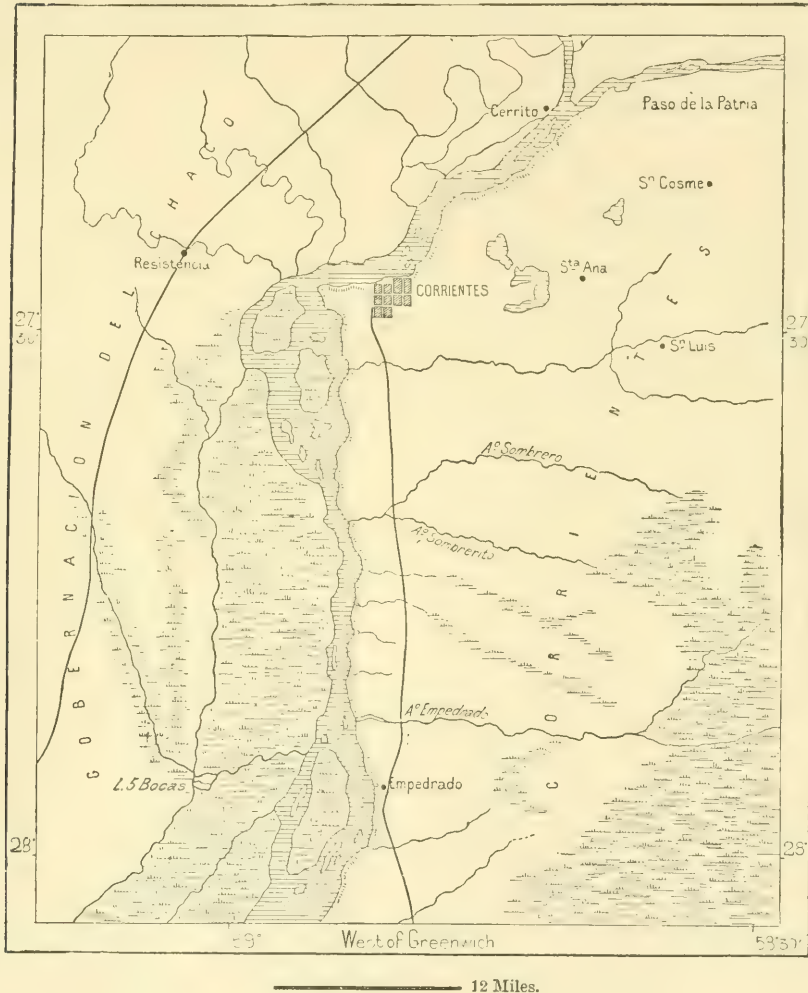
TOWNS OF CORRIENTES AND CHACO.

Corrientes, capital of the province of like name, and the most important place between Buenos Ayres and Asuncion, may be regarded geographically as the city of the fluvial confluence, although founded 15 miles below the delta (Tres Bocas). It owes its name of Corrientes—San Juan de los Siete Corrientes—to the swirling waters or eddies caused on the left bank by rocky ledges projecting into the stream. *Taraguy*, its Indian name, is said to mean the "Lizard-ground." It might also be called "Orangetown," so embowered is the place in groves of the golden fruit.

Corrientes was founded in 1588 on a bluff rising 25 or 26 feet above the average level of the river, and although distant 820 miles from Buenos Ayres, it is accessible at all times to craft drawing 10 feet and, for six months in the year, to vessels of 13 or 14 feet. It is the chief station for the steamers plying on the Parana and the Paraguay, which have here their building and repairing docks. During the Paraguay war it was the headquarters of the allies after the

Fig. 166.—CORRIENTES AND THE GREAT CONFLUENCE.

Scale 1 : 800,000.



fierce naval battle of *Riachuelo* had delivered it into their hands. Its railway communications with the southern provinces are still incomplete, and during the rainy season it is separated by a zone of lakes and morasses from *Cuati*, the chief agricultural market of the interior. Facing Corrientes on the right bank of the Parana stands the village of *San Fernando*, which occupies the site of an old camping-ground of civilised Guaycurus and Tobas. At first these Indians regularly

supplied the people of Corrientes with fuel, timber, fodder and other local produce. But the forests of Gran Chaco have gradually receded before the woodman's axe, and the natives have receded before the agricultural settlements which now follow along the river banks.

Formosa, on an isolated bluff opposite the Paraguayan town of Villa Franca, gives its name to the northernmost of the two divisions of Chaco, an almost uninhabited territory comprised between the Pilcomayo and the Bermejo. In 1892 it had a European population of not more than 5,000, mostly Italians and Slavs, and scarcely as many acres under cultivation. Yet the whole district bordering on Paraguay has already been bought up by sugar-planters, stock-breeders, and other capitalists. Formosa, the capital, has succeeded to *Villa Occidental*, which had to be evacuated by the Argentines when North Chaco was restored to Paraguay by the decision of the United States. In the hope of making it a riverside trading-place, Formosa was founded at a spot exactly midway between Corrientes and Asuncion, 140 miles from both cities. It also occupies a strong strategical position at a point where the river is rather narrow and very deep. The passage could easily be commanded by the guns of a fort erected at Formosa.

In the southern division of Argentine Chaco all the riverside lands have been ceded or sold by the Government, and some well-managed sugar works have already been established in the district. *Timbo* or *Puerto Bermejo*, which commands the confluence of the Bermejo with the Paraguay, is followed southwards by a Swedish settlement on the banks of the Rio de Oro, a small affluent of the Paraguay, and lower down by *Resistencia*, capital of South Chaco, at the mouth of the Rio Negro.

An agricultural colony founded in this district at the expense of the central administration is conducted by Government officials. But no direct route has yet been opened across the wilderness between *Resistencia* and the fertile plains of Salta.

TOWNS OF ENTRE-RIOS.

Below *Resistencia* the east bank is occupied at long intervals by a few stations, such as *Bella Vista*, founded in 1826 as a penal settlement; *Goya*; *Esquina*, at the confluence of the Parana and Corrientes; *La Paz*, formerly *Cavallu-Cuatia*, midway between Asuncion and Buenos Ayres, and one of the busiest ports on the river; *Hernandarias*, crowning a high wooded bluff; *Parana*, formerly *Bajada*, the "Landing Stage," the first town founded in Entre-Rios. This place has passed through great vicissitudes, having first been capital of the State, and then of the whole Republic, from 1852 to 1861. It still does a considerable trade as the outlet of the neighbouring colonies of *Villa Urquiza* and *Cerrito*. Most of the settlers in this district are Italians; but every European nationality is represented, including even some Rumanians accompanied by their buffaloes from the banks of the Lower Danube.

Here also a Russian *mir*, with property held in common, has been founded by

some Germans from the banks of the Volga. The woods and pastures remain undivided, and each family draws lots for its share of the land to be tilled in common. The first Russo-German colony founded near *Diamante*, south of Parana, has sent forth numerous branches numbering altogether about 10,000 settlers along the banks of the river. Excellent growers of wheat and horse-breeders, these emigrants from the Volga continue to prosper, and every year purchase new lands for the development of their commercial system, which is administered by a general assembly of all the heads of families, the women included. The Argentine Government having attempted to introduce the same organisation as in the other colonies, the sturdy peasants revolted, and since then they have been left to administer themselves after their own fashion. In the same region of Entre-Rios some positivists and disciples of Count Tolstoi have also established themselves in "harmonic societies."

TOWNS OF THE PROVINCE OF SANTA FÉ—ESPERANZA.

In clear weather the towers and domes of *Santa Fé* may be seen from the heights of Parana glittering in the setting sun some 12 miles away. This city, founded by Juan de Garay in 1573, and chosen by the Jesuits as the centre of the Missions amongst the Mocovi and other Chaco Indians, stands not on the Parana itself, but on a side branch, the Riacho de Santa Fé or Coronda, which broadens out into a lagoon, and is here joined by the Rio Salado. The port, approached through a labyrinth of channels, is accessible to craft drawing 6 or 7 feet; but most of the traffic is done on a railway 7 miles long, which connects Santa Fé with the riverside port of *Colastiné*, with a depth of from 24 to 26 feet even at low water.

A city of churches and convents, a venerable metropolis where Congress met occasionally to deliberate on the common interests of the Republic, Santa Fé was long abandoned by commerce, and even declined in population, until its prosperity was revived by the opening of the railways and the arrival of foreign settlers, who have brought the surrounding lands under cultivation.

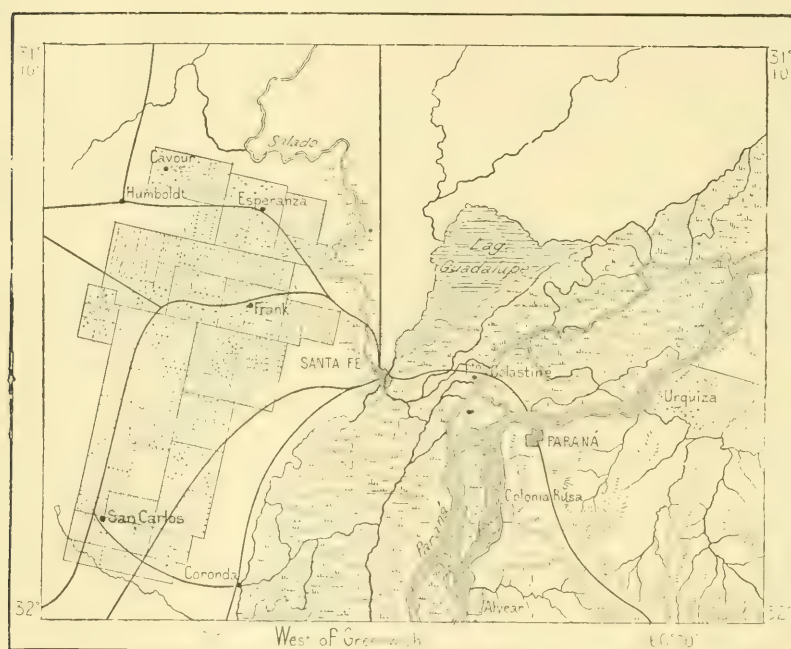
These settlers, who have enriched Santa Fé, are grouped round *Esperanza*, "Hopetown," founded in 1856 on the plains 18 miles north-west of Santa-Fé. The "hopes" of the founders have been realised. The two hundred Swiss families who arrived before a single cabin had been erected for their reception, have been followed by thousands and thousands of other families, French, Germans, but especially Italians. Towns, villages, steam factories, workshops of all kinds have sprung up in the pampa, where the railways have ramified in every direction. The pleasant little town of *Esperanza*, with its rows of *paraísos*, "paradise trees" (*melia azedarach*) lining all the thoroughfares, bears on its town hall the inscription in Spanish, "Subdivision of Property." To this subdivision of the land into small and average holdings the district assuredly owes its prosperity, yielding crops a hundredfold more abundant than those obtained from far more fertile

lands in other provinces held by a few great landowners. Some leagues north of Santa Fé may still be seen traces of the trench formerly cut to arrest the mounted Indian raiders. These earthworks have long been crossed by the settlers, who have transformed every railway station to an agricultural centre, thus step by step converting the wilderness to a cultivated plain. They are already approaching the plantations of Santiago del Estero.

Below Santa Fé and Parana, a cliff rising 260 feet above the left bank is crowned by the town of *Diamante*, which occupies a superb position at the head of the delta. The Parana, contracted to a narrow channel at this point, is more

Fig. 167.—SANTA FÉ AND ITS FIRST COLONIES.

Scale 1 : 1,250,000.



easily crossed than in the upper and lower reaches. Hence this strategic position has been hotly contested in all the civil wars, and here Urquiza's army of 20,000 horse swam the current. Like Parana, Diamante is surrounded by Russo-German settlements.

Lower down a lateral creek, communicating with the main stream during the floods, is occupied by the town of *Victoria*, so named from a victory gained in 1728 over the Minuan Indians, who were driven beyond the Uruguay to the Charma district. In the neighbourhood the archæologist Ramon Lista has discovered some burial-places filled up with the remains of these Indians.

ROSARIO.

Rosario, the chief place in the province of Santa Fé, and second largest city in Argentina, owes the foundations of its prosperity to the civil wars. Buenos Ayres having withdrawn from the rest of the Confederation in 1854, the Government installed at Parana ordered the construction of a railway from Rosario to Cordoba, and at the same time granted a reduction of 18 per cent. on the Customs in favour of all vessels ascending the Parana without touching at Buenos Ayres or any other port in the Plate estuary. Rosario at once benefited by this decree, the more so that it is accessible throughout the year to ships drawing 16 feet, whereas till recently large vessels had to anchor in the offing a great distance from Buenos Ayres.

Rosario has the further advantage of lying at the bend of the river, where it begins to trend south-east in a line with the estuary, and it has thus become the busiest riverside port in the whole basin. The Cordoba railway has also made it a rival of Buenos Ayres for the direct foreign trade of Argentina. It is now visited by the steamers of no less than fourteen transatlantic companies, which here ship wheat for Europe, alfalfa or lucerne for Brazil, metals, hides, and other produce for all parts.

The aspect of the city is essentially commercial, with piers lined by shipping, quays intersected by rails, warehouses stocked with goods, tramways radiating in all directions, telegraph and telephone wires crossing and re-crossing at every street corner. Rosario is inhabited by a population of even a more cosmopolitan character than that of its commercial rival, Buenos Ayres. In England its name is still chiefly associated with colonisation schemes notoriously mismanaged, and ending in disastrous failures.

The railway from Santa Fé to Cordoba was constructed by an English company, which received a concession of all the land for a width of three miles on both sides of the line on the condition of colonising the country. Hence, since 1870, *Bernstadt*, *Carcaraña*, *Cañada de Gomez*, *Tortugas*, and other stations have become so many agricultural settlements, peopled, like *Esperanza*, by Italian, French, Swiss, and German peasants. The English settlers at *Cañada de Gomez*, although specially favoured by the Company, never prospered, and have now been replaced by others from the Continent.

SAN NICOLAS—MARTIN GARCIA.

San Nicolas, chief riverine port between Rosario and Buenos Ayres, is also one of the large cities of the Republic; it was even, at one time, proposed as the capital of Argentina. It is followed lower down by other busy ports, such as *Obligado*, where the dictator Rosas attempted to defend the course of the Parana against an Anglo-French squadron in 1845; *San Pedro*, with a good natural harbour of about 300 acres; *Baradero*, where a prosperous Swiss colony was founded in 1856; *Zarate*, centre of the numerous insular colonies clustering about the

delta; *Campana*, a busy port on the Parana de las Palmas, with an extensive frozen-meat factory.

The rocky islet of *Martin Garcia*, with a lazaretto and quarantine station, guards the approaches to the delta, beyond which a sinuous channel leads through the spacious estuary to the capital of Argentina.

TOWNS OF THE PROVINCES OF JUJUY.

If the Parana is the great fluvial artery connecting Buenos Ayres and the La Plata estuary with the interior of the continent, the land route in a pre-eminent sense is the historical highway which, under the Spanish administration, connected the two seaboard of La Plata and Peru through the northern Argentine provinces of Jujuy, Salta and Tucuman.

In the province of Jujuy, conterminous with Bolivia, the first place on the route leading down from the Cortaderas Pass (12,965 feet), is the old Quichua town of *Humahuaca*, near the source of the San Francisco, over 10,000 feet above the sea. After the conquests, its inhabitants, who had offered a stout resistance to the invaders, were removed bodily to La Rioja, and replaced by conquered Indians from Famatina.

Below Humahuaca the track, which follows the right bank of the river along the foot of the snowy Chañi range, crosses several streams before entering the broad well-watered plains (4,000 feet), where stands *Jujuy*, capital of the province. This place, built by Velasco in 1592, still preserves its aspect of an old Spanish town, and is surrounded by plantations extending into the lateral valleys watered by affluents of the Rio Grande, one of the main branches of the Rio Bermejo. Jujuy, which abounds in agricultural produce of the sub-tropical and temperate zones, owes its chief importance to its transit trade with Bolivia carried on by convoys of mules and llamas, and comprising such commodities as maize, fruits, chicha, and especially salt extracted from the dry bed of Lake Casabinda. Its fairs are much frequented, and here many Bolivians have settled, thus repairing the heavy mortality caused by pneumonia, rheumatism, *chuchu* fevers, and other maladies due to the cold winter winds, and in summer to the noxious exhalations from the badly-kept canals. In the neighbourhood are some petroleum wells, and the thermal saline springs of the *quebrada de los Reyes* are much frequented by rheumatic patients.

ORAN—RIVADAVIA.

Below Jujuy, the San Francisco continues to flow in a steep bed obstructed by rapids, till it reaches a more level incline beyond its great bend near the *Ledesma* sugar plantations. In this part of the basin the chief place is Oran, standing at a height of 1,000 feet, on a torrent near the point where the San Francisco unites with the Tarija to form the Bermejo. Oran is surrounded by rich sugar and other plantations, cultivated chiefly by the Mataco and Chiriguano

Indians. Although Oran is accessible to river craft all the way from Buenos Ayres (1,850 miles), its traffic is carried on mainly by the overland route to the Jujuy railway, pending the construction of a local branch in connection with that line.

South-eastwards lies the agricultural colony of *Rivadavia*, on the Rio Teuco, where numerous Bolivian squatters have received allotments of 1,250 acres per

Fig. 168.—GENERAL VIEW OF JUJUY.



family. Rivadavia is connected by a military carriage-road with the station of *Puerto Bermejo* on the Paraguay.

TOWNS OF THE PROVINCE OF SALTA.

Salta, capital of the province of like name, stands on the Lerma plain, which is watered by the Rio Arias, and numerous *tagaretes*, as the irrigation canals are

locally called. Lying from 100 to 120 feet lower than Jujuy, but more to the south, Salta cultivates plants of the temperate zone, so that the district presents a somewhat European aspect. Like Jujuy, it relies chiefly on its transit trade with Bolivia and Chili, and about a tenth of the inhabitants are of Bolivian origin. In the neighbourhood Belgrano gained a first success over the Spaniards in 1812, and in honour of this victory the province adopted the black and blue colours now incorporated in the Argentine flag.

Southwards follow several large agricultural villages, such as *Cachi*, which gives its name to the neighbouring plateaux and nevados, *San José*, *Molinos*, *San Carlos*, *Cafulate*, all of which places make excellent wines and raise crops of the famed *Trigo de los Valles*, "Valley wheat." The mules and horned cattle bred by the Christian Calchaquis of the district are highly esteemed throughout Argentina and Chili.

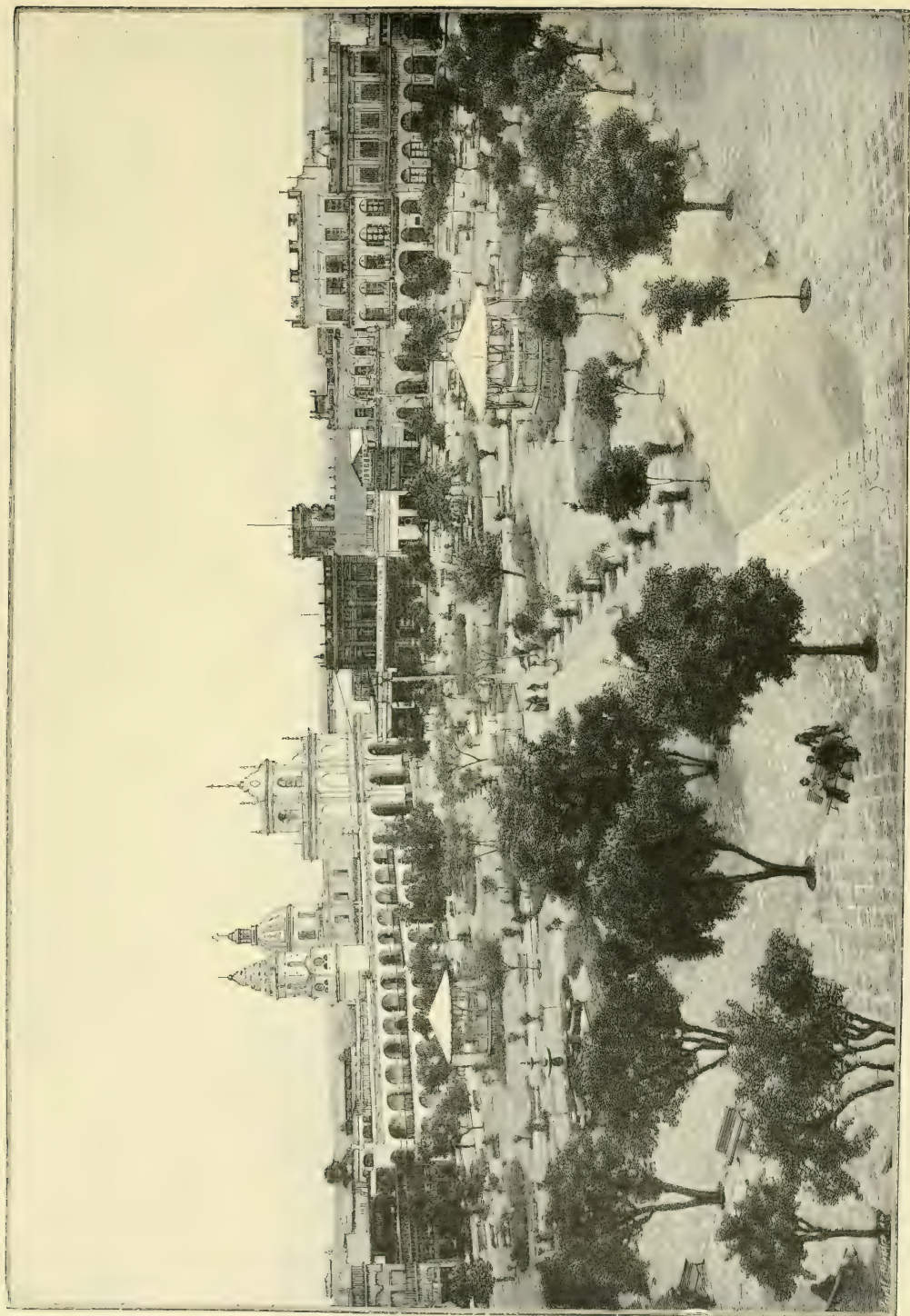
On the railway between Salta and Tucuman the chief station is *Rosario de la Frontera*, on a head stream of the Juramento. Here are sugar and tobacco plantations, and here is made the cheese known in every part of Argentina by the name of *tufi*. In summer invalids flock to the neighbouring thermal waters, which have a temperature of over 167° Fahr., and are said to be very efficacious. The whole district abounds in sulphurous and other hot springs, which, however, are little utilised by the natives.

According to Brackebusch the heat of these springs is due, not to the igneous character of the ground, but to the action of the iron pyrites which are contained in large quantities in the surrounding schistose limestone mountains, and which at contact with water liberate a high degree of heat. These formations are also charged with petroleum, which is distilled in the lower depths, and which may perhaps explain the local earthquakes and the inflammable gas-jets occasionally seen above the surface.

TOWNS OF THE PROVINCE OF TUCUMAN.

The province of Tucuman, certainly one of the richest of Argentine, has been described in somewhat extravagant language by native and even by some European writers. Sarmiento speaks of it as a tropical land, where nature has displayed its greatest pomp, the garden of Argentine, the Eden of America, without a rival on the face of the earth, covered with sugar-cane brakes, orange and myrtle groves, the resort of gaudy butterflies, brilliant humming-birds, green parrots, blue magpies, golden toucans, and so forth. But this idyllic picture has its reverse side, and Tucuman with all its advantages undoubtedly suffers from some serious drawbacks. The dangerous and wasting *chuchu* fever is endemic, especially in the marshy districts infested by mosquitoes, which alone seem capable of resisting the malarious exhalations which rise from the black mud festering in the hot sun.

Another much-dreaded scourge are the swarms of locusts, which at times transform entire districts to lifeless solitudes. From the multitudes of these winged pests the whole landscape at times assumes a russet colour like that of

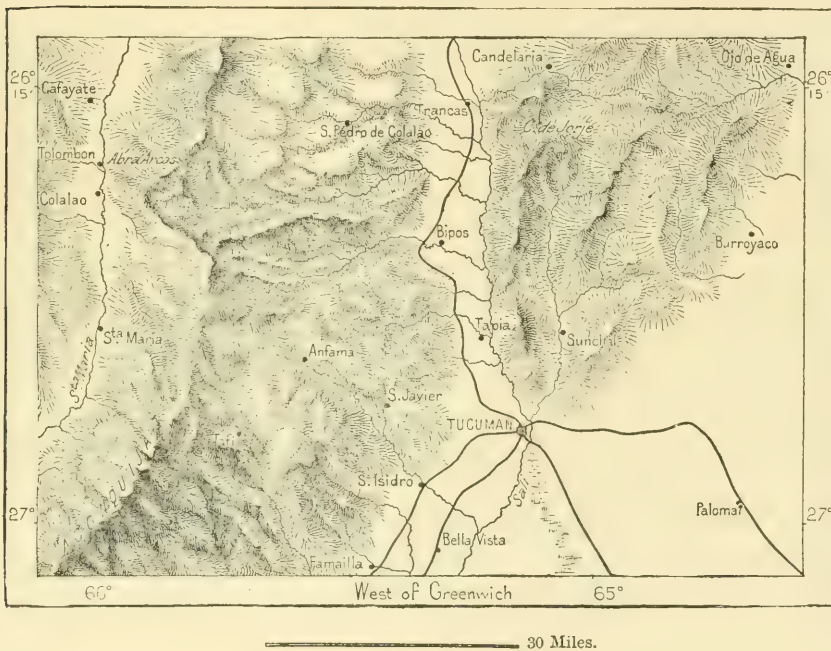


TUCUMAN.

burnt bricks. "Earth, trees, and bush," writes Mr. Knight, "had all assumed the same curious hue, the effect being something like that of early winter on some of the vegetation of northern Europe. We could not at first conjecture what the strange appearance signified—it was as if some pestilential blast had withered up all the life of the land. On approaching we found this to be a vast multitude of locusts, that were settled so thickly on everything that no twig or leaf or inch of bare earth was left visible. There was nothing to be seen anywhere under the sky but the mahogany-coloured bodies of these fearful creatures; we rode through several leagues of them, and as we rode they rose from under our feet in thousands, with a multitudinous crackling sound as of a huge bonfire, and then

Fig. 169.—TUCUMAN.

Scale 1 : 1,500,000.



when we had passed, settling down again, but revealing in their short flight the devastation they had wrought. Little but bare barkless stacks were left of tree and bush; even the grass had been devoured down to the ground.”*

Tucuman, metropolis of the north, although preserving in a slightly modified form the old Quichua name of *Tucma* applied to the province under the Inca rule, is nevertheless of Spanish foundation, dating from the year 1585. This historical city is admirably situated, at an altitude of 1,480 feet, in a fertile and highly-cultivated plain, which inclines gently down to the Rio Salí, and rises westwards in the direction of the superb peaks of the Sierra Aconquija. Here Belgrano defeated the Spaniards, and here the National Congress proclaimed the

* *Op. cit.*, Vol. I., p. 289.

independence of the land in 1816. Since then Tucuman has also taken a large share in the civil wars by which the country has been wasted.

Nevertheless, the city has continued to increase, and is now the fourth place in Argentina for population. The local industries have also been developed by a steady stream of immigration, comprising Europeans of all nationalities. As many as thirty large factories have been established in the outskirts, and sugar culture, introduced from Peru in 1824, has succeeded so well that in 1890 this industry employed 7,000 hands, and yielded 20,000 tons of sugar and 1,100,000 gallons of rum from a total area of 20,000 acres. The district, which is studded with farmsteads and hamlets, also yields coffee, hemp, wheat, and other produce.

Tucuman enjoys some reputation as a centre of intellectual life, and one of its colleges takes a high place amongst the scholastic institutions of the Republic. Next to the capital the most flourishing agricultural towns are *Monteros* and *Medinas*, both situated on affluents of the Rio Dulce.

TOWNS OF THE PROVINCE OF SANTIAGO.

Santiago del Estero, "St. James of the Morass," was the centre of the ancient province of Tucma (Tucuman), which was brought under the rule of the Incas towards the beginning of the fourteenth century. Here the Spanish conquerors established (1553) the first permanent city in the Argentine possessions, and this place was even long known by the name of Tucuman, now transferred to the more flourishing northern city.

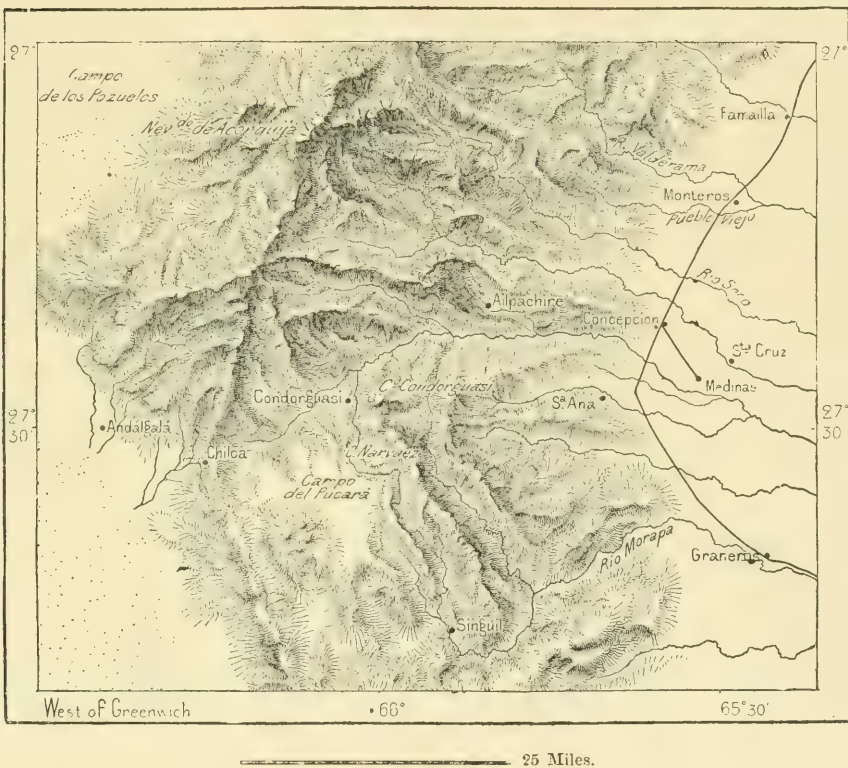
Standing on the right bank of the Rio Dulce on a plain about 650 feet above sea-level, Santiago, as indicated by the epithet "*Estero*," is surrounded by swamps and lagoons, former beds of the shifting stream. Half of the houses were swept away by an inundation, in 1633, when some of the inhabitants migrated to Tucuman, others to Cordoba. The deserted city, often exposed to the attacks of the Indians, remained under the government of the Jesuits, who transformed the country to another Paraguay, with a similar theocratic administration and similar social usages. In all respects the populations of both regions resemble each other; they display the same love of cleanliness, and the same taste for music and the harp, which has always been the national instrument of the Guarani people. The ordinary diet, almost exclusively vegetable, is the same, as is also the universal use of maté as a stimulating beverage.

After the proclamation of Argentine independence, Ibarra, dictator and absolute master for thirty years, made every effort to maintain the outlying territories, which lay beyond the sphere of political agitation. But although reduced to a mere collection of adobe houses, Santiago has recovered a little of its former activity since the completion of the line connecting it with the Cordoba-Tucuman railway. It exports lucerne, cheese, and other produce, and also engages in the sugar industry, although with less success than Tucuman.

Loroto, *Atamisqui*, *Salariña*, are also agricultural settlements, which, like *Santiago*, have suffered from the floods and shiftings of the *Rio Dulce*. A little north of the fertile *Campo del Cielo*, "Elysian Fields," is seen the famous meteoric block, which, when studied by a scientific commission in 1788, formed a mass of about 250 cubic feet, weighing 45 tons, and containing one-tenth of nickel. Since then it has been greatly reduced by chipping, and numerous fragments are preserved in various museums. The ground round about is strewn with other meteorites of smaller size. *Matara*, also an agricultural settlement, stands on the *Rio Juramento*, near the fords formerly used by the *Mocovi* and

Fig. 170.—ANDALGALA AND MT. ACONQUIJA.

Scale 1 : 1,100,000.



Abipon Indians; hence this place was much exposed to the incursions of those predatory tribes. *Matara* was the starting point of an easy route, which here traversed the solitudes of *Gran Chaco* in the direction of *Corrientes*.

TOWNS OF THE PROVINCE OF CATAMARCA.

South-west of *Tucuman* stretches the mountainous province of *Catamarca*, bounded eastwards by the *Aconquija* range and its offshoots. *Catamarca*, the provincial capital, stands at an altitude of 1,880 feet on the *Rio del Valle*, which

here ramifies in irrigation canals over the valley flanked on the east by the Sierra de Ancaste, on the west by the Ambato range. After its foundation in 1680 the settlement suffered so much from inundations that it had to be removed a few miles higher up. Catamarca communicates by rail in one direction with La Rioja and Mendoza, in another with Cordoba, Rosario, and Buenos Ayres, the line bifurcating at *Chumbicha*. By these railways are forwarded the oranges, dried figs, cattle, and other produce of the surrounding provinces.

Andalgala, so named from a valiant Calchaqui tribe long merged in the general Spanish population, bears also the name of *Fuerte*, from a now abandoned "fort." It lies at the foot of Aconquija, on a level plain 3,300 feet above the sea, and owes all its importance to its silver mines, the most productive in Argentina. The richest vein, which was worked by the Calchaquis before the conquest, but the existence of which was concealed by them, was rediscovered in 1849 from the revelations of an aged Indian. Standing at an altitude of 10,000 feet, it has an average monthly output of 200 tons of ore containing about 35 tons of pure metal. Some 3,000 mules are constantly employed conveying the ores to the *Pilciao* works, a remarkable establishment furnished with the best English plant.

THE CAMPO DEL PUCARA.

The industrious people of Andalgala also work the neighbouring kaolin beds for the manufacture of fire-bricks, cultivate the vine, which yields an excellent wine, export fruits to Tucuman, mules and asses to Chili, hides and guanaco fabrics to Cordoba. The wretched hamlet of *Pucara*, near the much-frequented pass between the snowy Aconquija on the north and the Manchao heights on the south, represents a real *pucara*, or "stronghold," which formerly stood here, and the circular ramparts of which may still be traced for a distance of nearly two miles.

This word *pucara*, Pelleschi tells, means *strength* in the Aymara, and *red* in the Calchaqui language, both appellations being appropriate, the one on account of the pervading colour, the other on account of the fortified works formerly erected in the district. The *Campo del Pucara*, as this district is called, forms a transition between the grassy ranges on the east and the arid sand-hills of the west. Although itself arid and parched, it affords sustenance to cattle during some months of the year, and was at one time thickly peopled. Extensive remains of Indian habitations, grouped together like so many separate villages, occur not only on the plain, but also along the slopes of the neighbouring heights.

If the Campo was formerly subject to the same climatic conditions as at present, it certainly could not have afforded subsistence to such populous communities. Yet there is no indication nor any tradition of a change of climate having taken place in the district since its occupation by man. Hence Pelleschi suggests that perhaps the local conditions may have been modified by the drying up of some extensive reservoir in the neighbourhood, some lacustrine basin, of

which the fish afforded food, while the water yielded a sufficient supply for domestic use and irrigation purposes. But however this be, a region which at one time teemed with human life, is now little better than a wilderness, interesting mainly to the explorer and antiquary.

In the western valleys of Catamarca are some settlements of the industrious Calchaquis, amongst others *Belen* and the neighbouring *Londres*, surrounded by vineyards, orchards, and rose gardens. Farther west *Tinogasta* exports mules and cattle to Copiapo, and the thermal waters of *Fiambala*, higher up the valley, attract visitors during the fine season.

TOWNS OF THE PROVINCE OF RIOJA.

The province of Rioja, like that of Catamarca, consists of upland Andean valleys, sloping south or south-west towards the Salinas, or salt plains, limited eastwards by the Cordoba Mountains. The fertility of the soil has become proverbial, and no other part of Argentina yields better wheat, wine, and oranges. All the land capable of being irrigated has already been brought under cultivation, and to extend the area of productive ground it would be necessary to construct reservoirs in the upland valleys. It is claimed for the light porous soil of the plains that, where sufficiently watered, it is more productive than the deep lands along the banks of the Parana, imparting a more delicate flavour to the grain and fruits grown in the district.

The city of *La Rioja*, founded in 1591 at the east foot of the Velasco Mountains, commands from its elevated terrace (1,670 feet) a wide prospect of the surrounding plains. Although now connected with the Argentine railway system, it has developed little trade or industry, owing to the restricted area of cultivable land; where the rivulets run out the desert begins.

THE CHILECITO MINERAL REGIONS.

More prosperous is the valley lying farther west, between the Sierra de Velasco and the snowy *Famatina* range. The town which gives its name to this superb group, straggles in a continuous line of houses and gardens some nine miles along the banks of a torrent to the point where the water ceases to flow. Another stream, descending from the Nevado de Famatina, waters the district of the more important town of *Chilecito*, or *Villa Argentina*, which has become the real industrial and commercial centre of the province. As indicated by its name, "Little Chili," its population is of Chilian origin, attracted by the mineral wealth of Rioja.

Both slopes of the valley between the Velasco and Famatina heights contain deposits of gold, silver, copper, iron, and nickel; all the streams are metalliferous, some to such an extent as to be useless for irrigation purposes. In several districts are seen heaps of scorïæ and the ruins of rude furnaces, showing that the copper

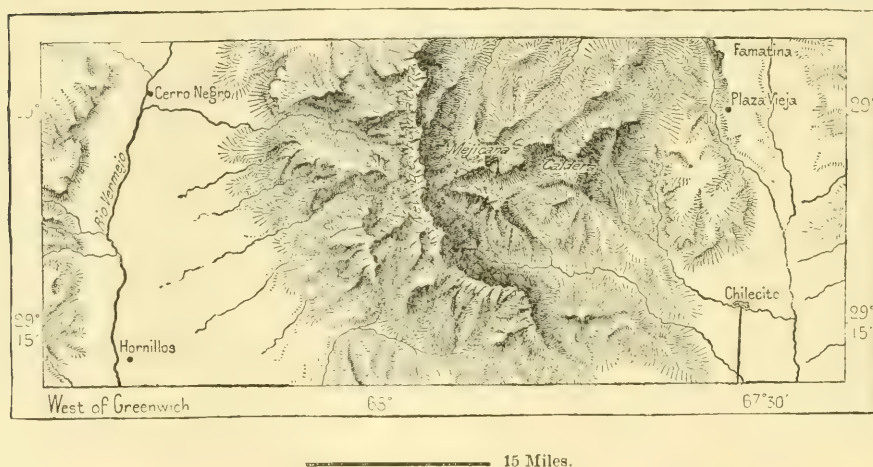
mines were formerly worked by the Calchaquis, and the metal used in the manufacture of arms and agricultural implements. The first serious operations of the whites date from 1804; but they have frequently been interrupted by the civil wars, or by the high-handed proceedings of the military commanders.

The mining region, in a pre-eminent sense, occupies the southern part of the Sierra de Famatina, the richest veins lying on the crests themselves near the central peaks at altitudes of from 13,000 to 15,000 and even 16,500 feet. Those of *La Mejicana* are said to have been discovered by some Mexicans by following to its source a stream charged with ochre. The limestone rocks of which these mountains are formed are intersected by innumerable metallic veins, pyrites of copper, gold, and silver in association with chlorine, iodine, arsenic, and sulphur.

Between 1820 and 1860 these gold and silver mines yielded £1,200,000,

Fig. 171.—CHILECITO AND FAMATINA.

Scale 1 : 1,000,000.



which was partly minted at La Rioja. At present operations have been extended to the copper mines, in which the ores contain about one-sixth of pure metal. Chilecito is connected by a branch line with the Argentine railway system, which gives access to the difficult tracks running from various points over the mountains. By one of these routes, which leads through *Vinchina* to the Upper Vermejo valley, Chilecito maintains active relations with the mining centre of Copiapo on the opposite (Pacific) slope of the Argento-Chilian Cordilleras.

TOWNS OF THE PROVINCE OF SAN JUAN.

South of Rioja follows the province of San Juan, which is also a mining district, and which, like Catamarca and Rioja, lies entirely within the region of closed river basins. *San Juan*, the capital, is well situated at an altitude of

2,130 feet on a fertile plain watered by the innumerable ramifying rills of the Rio San Juan. Founded in 1561 about four miles farther north, and afterwards removed to its present site, San Juan presents an agreeable aspect with its belt of cultivated ground and magnificent circular boulevard planted with poplars. To the west lies the pleasant watering-place of *Zonda*, and to the east the town of *Caucete*, officially *Independencia*, in a district reclaimed by irrigation works from the wilderness. San Juan possesses a botanic garden and a school of mines in connection with the neighbouring mineral deposits. *Jachel*, 124 miles farther north, lies in a district abounding in mines and thermal waters. Standing on a copious river, which is swollen by torrents from all the lateral glens, Jachel has become the chief centre of traffic for all the northern districts of the province. From this point numerous convoys of mules are directed over the Cordilleras, and across the plateaux to the two Chilean seaports of Huasco and Coquimbo. But the portorage of goods conveyed by these difficult and even dangerous routes is so heavy that the traffic must entirely cease as soon as the Argentine and Chilean railway systems are connected by the inter-oceanic trunk-lines now in progress.

TOWNS OF THE PROVINCE OF MENDOZA.

Next to that of Tucuman, the province of Mendoza is the most populous of all the Andean regions within Argentine territory. It owes its exceptional importance to its position on the main Continental highway between Buenos Ayres and Valparaiso. The Cumbre Pass, over which will be carried the future trans-Andean railway, lies between Aconcagua and Tupungato, loftiest peaks of the Cordilleras. Farther south the range is interrupted by lower passes; but they are little frequented, owing to their remoteness from the route connecting the two vital points of Chili and Argentina.

Like the neighbouring provinces, Mendoza possesses some rich mineral deposits; but they have been little worked during the present century, and its chief resources are its vineyards, cereals, and lucerne meadows watered by the torrents descending from the Cordilleras. Sericulture, of which great hopes were entertained when introduced about the year 1850, has since been abandoned. Jointly with the provinces of San Juan and San Luis, Mendoza belongs to the region known by the name of Cuyo. Under the Spanish colonial rule this region depended administratively on the government of Chili.

Mendoza, the capital, and formerly metropolis of the Spanish vice-royalty of La Plata, was founded in 1560 on a plain traversed by rivulets utilised as irrigation rills. But it does not occupy its original site. The first Mendoza, built with taller houses and heavier materials, was overthrown in a few minutes by the fearful earthquake of 1861. The catastrophe occurred on Ash Wednesday evening, when all the inhabitants were assembled in the churches, all of which gave way, burying beneath their ruins 10,000, or according to some 13,000, in a total popula-

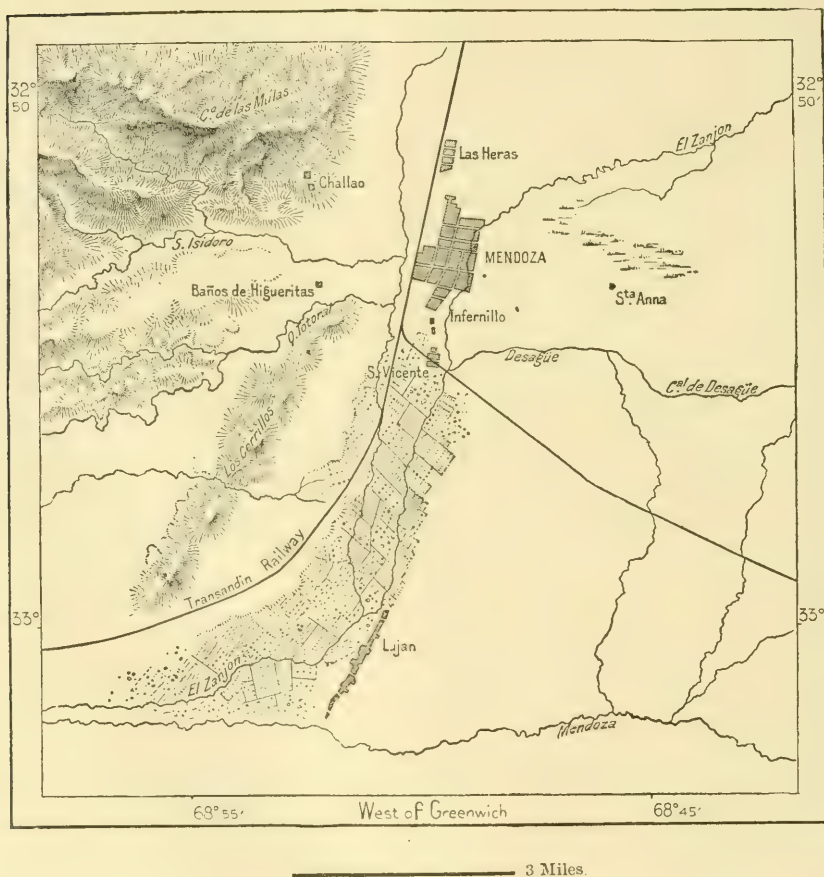
tion of less than 15,000. The geologist Bravard, who is traditionally said to have predicted the shock, was amongst the victims.

As Mendoza is not situated in a volcanic region, and as there are no craters in the neighbouring Andes, the place can scarcely have been overthrown by an ordinary igneous disturbance. Brackebusch suggests that it may have been caused by the combustion of the bituminous beds below the surface, accompanied by an explosion of gas.

In rebuilding the city, the inhabitants took as central thoroughfare the

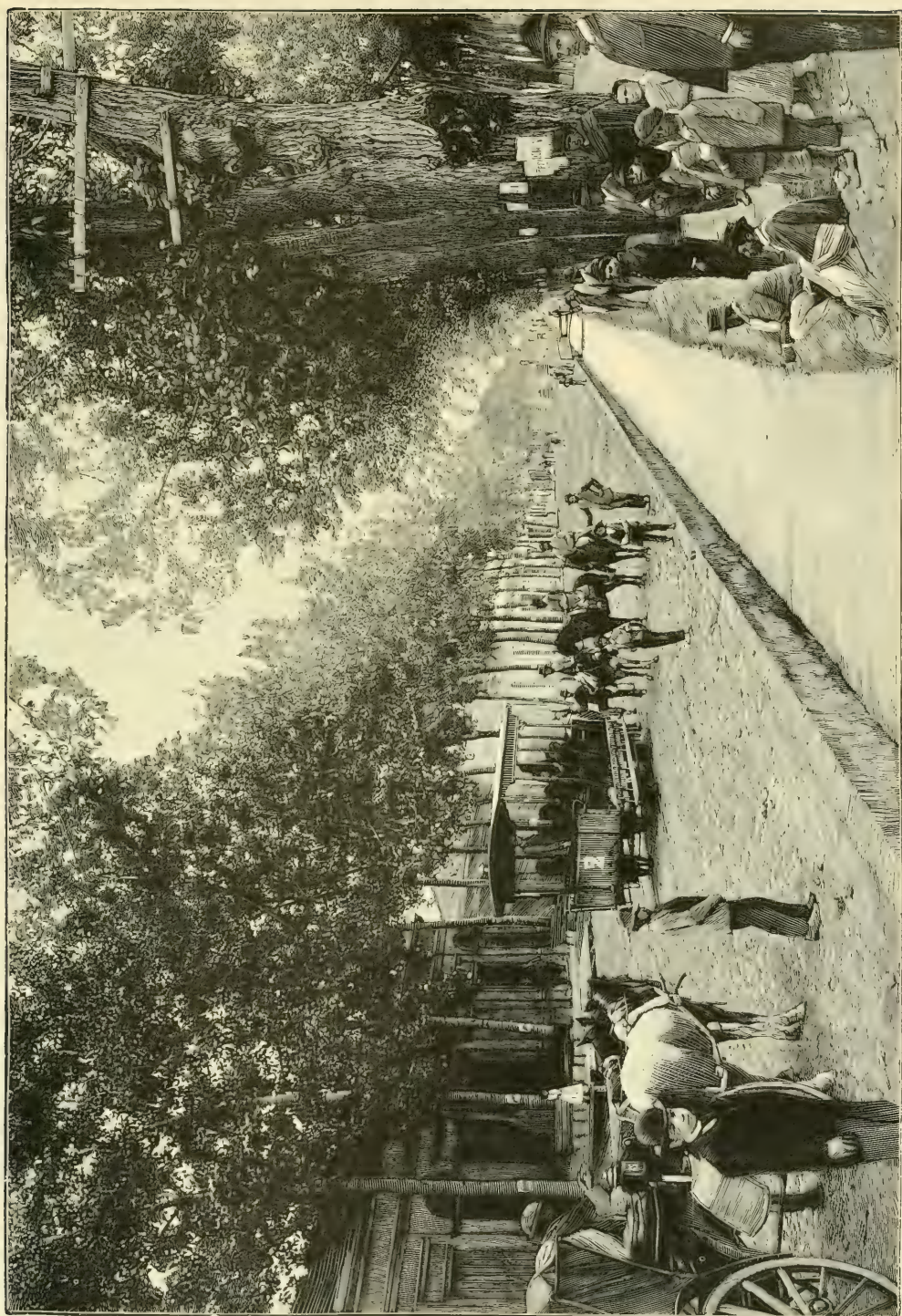
Fig. 172.—MENDOZA.

Scale 1 : 200,000.



Alameda, an avenue of poplars and elms, which formed the fashionable resort on fine summer evenings. The new houses, painted in bright colours and built of elastic adobe, which vibrates under a concussion, are disposed along the banks of a canal lined with rows of trees, and ornamented with fountains and waterfalls.

Lying on the main highway between Buenos Ayres and Valparaiso, Mendoza is the chief station between the two Republics. It is also an agricultural centre of the first importance, and seat of a great school of agriculture. The surround-

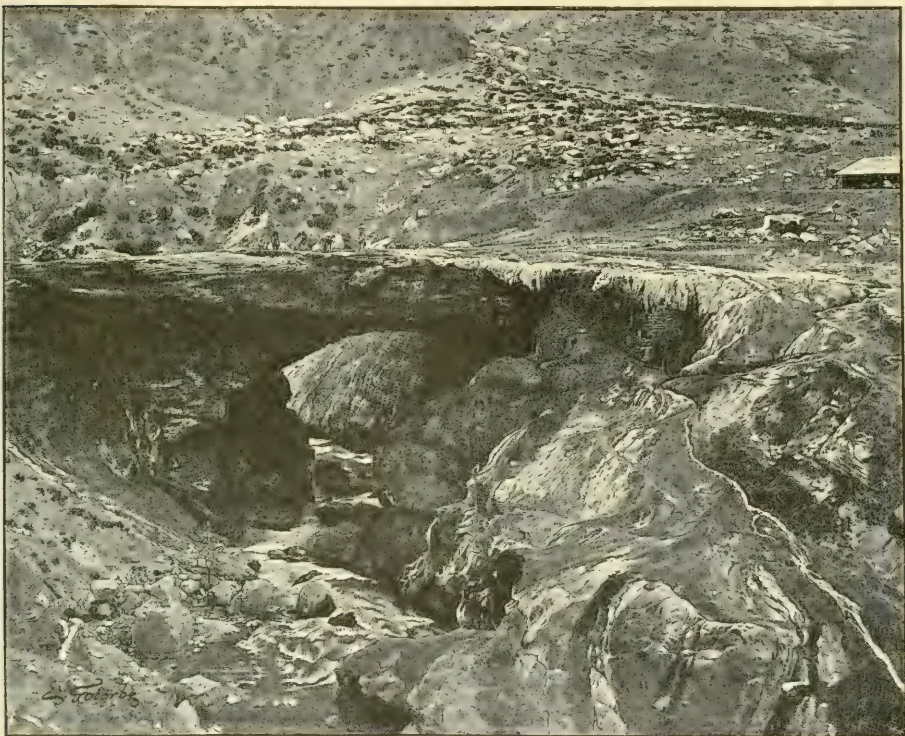


MENDOZA.

ing plains, the best watered in Argentina, contain admirable *invernadas*, artificially irrigated meadows yielding splendid crops of lucerne, exported with wools, hides, and cattle, especially to Chili. The wine grown in the district is all sent to the Buenos Ayres market. In some years as many as 50,000 horned cattle are forwarded over the Cumbre Pass to the Chilian markets.

West of Mendoza the road and the railway, starting from an altitude of 2,640 feet, run south-west through the Rio de Mendoza Valley to *Challao*, a watering-place six miles from the capital, and thence to *Uspallata* about 6,200 feet above the sea. Beyond this point the railway has been carried 15 miles, stopping

Fig. 173.—INCA BRIDGE.



at present (1894) at an elevation of 6,560 feet below *Punta Vacas*, where begin the difficult escarpments. *Casuchas*, or "shelters," have been erected at intervals along the slope of the Cumbre, as refuges against snow-storms and avalanches. One of these nestles at the foot of a precipice not far from the "Inca's Bridge," a natural arch of conglomerate cemented by the calcareous deposits of thermal springs (97° Fahr.), which bubble up on the floor of a cavern and fall in cascades down to the Las Cuevas rivulet. The arch, beneath which flows the creek, rises 70 feet above the gorge, and has a span of 100 feet; long stalactites hang from the overhanging vault. Although no bathing establishments have yet been founded on the spot, a few invalids, especially Chilians, already resort to the

mineral waters, which have the reputation of being highly efficacious in the case of rheumatic complaints and affections of the blood.

But Uspallata itself, although presenting some advantages as an agricultural centre, has hitherto failed to attract immigrants. It stands at too great an altitude, about 6,350 feet, and consequently remains without importance, except as a frontier custom-house. Nor have any great returns been yielded by the mining operations carried on to utilise the copper and other mineral deposits of the district. During the last century the *Paramillo* mines, which stand at various elevations between 9,000 and 10,600 feet, were actively worked. Enormous excavations were made by the unfortunate Araucanian captives, who were employed in the galleries, and perished by thousands. On these uplands the wind, which takes the name of *paramillero*, from the district, blows at times with tremendous fury.

SAN CARLOS—THE SAN RAFAEL COALFIELDS.

South of Mendoza the route passes *San Vicente*, which may be regarded as a suburb of the capital. Some 60 miles farther south it reaches *San Carlos*, the chief station between Mendoza and *San Rafael*. San Carlos has never recovered the disaster of 1868, when the Indians surprised and massacred its garrison, plundered the houses, and carried off the women. At present the settlers in the district, nearly all Chilians, live in isolated houses and farmsteads scattered over the surrounding plains.

Brighter prospects seem to be in store for San Rafael, which stands near the banks of the Rio Diamante at the point where it issues from the mountains. Thanks to the fertility of the soil, its numerous streams, and the relatively easy passes by which it communicates with Chili, this place promises, in the near future, to become one of the chief cities of Argentina. Most of its first inhabitants were refugees from other provinces, exiles or criminals, who were known by the half-Indian name of *guayqueros*, or "ostrich-hunters." They acted as guides to the military expeditions during the operations carried on in the region of the Andes.

So recently as 1872 the place was besieged, or at least blockaded, by the surrounding nomad tribes. None of the garrison dared to venture any distance from the fort, and the people had to keep their cattle carefully guarded in two enclosures. At present the artificially watered grassy plains stretch far from the town, and convoys of mules, laden with fodder for the Chilian markets, are constantly crossing the Cordilleras by the Planchon and Cruz de Piedra passes. Near San Rafael the settlers have already introduced the cultivation of the vine, for which soil and climate seem well suited.

West of San Rafael, which has also suffered from the predatory Indians, the Argentine foothills contain beds of coal, which certainly belong to the carboniferous formation, and not to the triassic system, like those of the San Juan and Mendoza districts. The coal burns with a clear flame, and is equal in quality to

average English coal. Numerous beds have already been surveyed, and one layer in the *Eloisa* mine is no less than 13 feet thick.

All the indications seem to show that this coalfield stretches southwards under the Jurassic strata as far as the Neuquen district. The same region contains petroleum, alabasters, and limestones, valuable as building material. Moreover, the ashes of the San Rafael coal have a large proportion of vanadium, the salts of which are the best mordants for aniline dyes. But the best coal pits stand at a great altitude, from 8,000 to 10,000 feet, and are covered with snow in winter. Hence it would be difficult to work them with profit before the Rio Diamante is made navigable, and these elevated regions opened up by the railways now in course of construction over the Cordilleras.

TOWNS OF THE PROVINCE OF SAN LUIS.

The province of San Luis, separated from that of Mendoza by the course of the Desaguadero and of the Salado, comprises a portion of the central uplands and stretches far into the southern deserts. It is one of the most thinly peopled regions of Argentina, although abounding in mineral resources, and very fertile in all its irrigable districts. It has also the advantage of lying between Cordoba and Mendoza, and is consequently intersected by the main highway between the Atlantic and the Pacific.

But of all the Argentine populations those of San Luis have suffered most from the border warfare. For over 250 years, from the close of the sixteenth century to the middle of the nineteenth century, the city of *San Luis* was the advanced post of the Spaniards and Argentines against the Pampas Indians; and with such enemies the struggle was incessant. More than once the Indian horsemen even advanced beyond San Luis, extending their incursions into the settled districts, either as conquerors, or as allies of one or other of the Argentine factions. Of all the Hispano-American peoples none have taken a more active part in these fratricidal conflicts, in which the youth of the country have been more than decimated. Hence, even still the proportion of women is greatly in excess of the men, despite the stream of immigration, in which the males always outnumber the females.

CITY OF SAN LUIS—VILLA MERCEDES.

Built in 1597 by Martin de Loyola, nephew of Ignatius Loyola, founder of the Jesuit Order, San Luis was long known by the name of *Punta de los Venados*, from the bluff on which were erected the first houses; hence the appellation of *Puntanos*, given to the inhabitants. The city stands at an altitude of 2,500 feet on the slopes of the Punta, which commands an extensive prospect of the surrounding plains and mountains, limited westwards by the snowy crests dominated by Tupungato and the Cerro de Plata. A reservoir containing 420 million cubic

feet feeds the irrigation rills which ramify over the neighbouring vineyards and orchards. But the gold washings, carried on in the highest gorges of the mountain near the Tomolasta peak, no longer yield adequate returns.

Villa Mercedes, founded in 1856 under the name of *Fuerte Constitucional*, has unexpectedly risen to importance, thanks to its position on a fertile plain watered by the Rio Quinto on the route of the inter-oceanic railway at the point where it turns the Sierra de Cordoba on the south. Villa Mercedes thus occupies an advantageous position as the converging point of the future trunk lines from Cordoba, Rosario, Buenos Ayres, Bahia Blanca, and Mendoza. Founded in a district lately wrested from the Pampas Indians, this place continues to thrive and increase in population at the expense of *Achiras* and *San José del Morro*, stations which lie farther north on the old highway to Chili. Villa Mercedes is surrounded by rich lucerne meadows.

TOWNS OF THE PROVINCE OF CORDOBA.

Rio Cuarto, another busy station of the Argentine railway system, lies, as indicated by its name, on the "Fourth" of the rivers descending from the eastern slopes of the Cordoba mountains. It lies within the province of Cordoba, and, like San Luis, it was long a bulwark against the Pampeans on the extreme frontier of the settled districts of Argentina. It was often besieged, the women and children taking refuge in the churches, while the men fought in the streets. Since the return of peace its agricultural resources have been developed by the construction of irrigation works, and at present Rio Cuarto is the second city in the province.

Another outlet for the produce of the district is afforded by the twin towns of *Villa Maria* and *Villa Nueva*, the former on the left, the latter on the right bank of the Rio Tercero, which is here crossed by a railway bridge.

Frayle Muerto, the first agricultural colony in this district, was founded by English settlers in 1868; but it never prospered, and the colonists dispersed. Since then peasants of other nationalities have arrived in large numbers, and the country about *Bell-ville*, as Frayle Muerto is now called, has been brought largely under cultivation, yielding rich crops of lucerne and wheat.

This place is associated with the fortunes of the ill-fated Henley colony. Some years ago there arrived from England "a strange crew of young English gentlemen, with the ostensible object of cattle-farming. If energy and skill in caña-drinking and horse-racing are the sole requisites for a cattle-farmer, then none could be better than these. These young men, unsteady, fresh from school and college and regiment, without practical knowledge of anything, arrived at Rosario in a batch, and considerably astonished the natives by their manners and customs. The Henleyites came down on the land in the fashion of a hostile army. They had a uniform of which a plumed helmet was not the least conspicuous article; each was provided with a regulation rifle, revolver, and sabre, besides an arsenal of wonderful weapons he took on his own account in addition.

They were encamped for some time in a village of wooden huts, while lands were being apportioned out to them; and here they soon showed what manner of colonists they were going to be. Drinking, gambling, and horse-racing was the order of the day. The capital they had brought with them took unto itself wings; for let the *gringo* (European), however knowing in his own land, skin his eyes ere he match himself on the turf with the simple gaucho of the pampas.

Fig. 174.—CORDOBA.

Scale 1 : 800,000.



18 Miles.

“So things went on, and the natives smiled at the ways of the *locos Ingleses* (‘mad Englishmen’), won their money, acquired their mortgaged lands, while the colonists diminished woefully in number. Many of these gentlemen ultimately were driven to take any menial work they could get; some died of delirium tremens, others self-despatched with their own revolvers; the remainder settled down, after the first wild burst was over, with diminished means to the business they had come over to undertake. The prosperous little town of Frayle Muerto

has been built for the most part on the spoils that have been wrung from the ill-fated Englishmen by publicans and usurers." *

CITY OF CORDOBA.

Cordoba, capital of the province and second largest city of the Republic west of the Rio Parana, is one of the old settlements in South America, having been founded by Cabrera in 1573, seven years before Buenos Ayres. Standing on the right bank of the Rio Primero about 1,300 feet above the sea, it occupies the deepest part of a valley excavated by the running waters between high lateral cliffs; to the west is seen the breach through which the waters escape between two steep escarpments.

Headquarters of the Jesuit rule for a period of two centuries, Cordoba till recently still presented the dull aspect of an ecclesiastical town. But since 1870, when it was brought into connection with the Argentine railway system, it has again become a busy centre of trade and industry, as well as the rival of Buenos Ayres in intellectual progress. The university, which had been established after the expulsion of the Jesuits in 1767, and which, possessing neither books, instruments, collections, nor professors, had hitherto taught little beyond "Church Latin" and scholastic philosophy, was re-constituted in 1870 on a liberal basis, and since then serious studies have been introduced by a staff of learned teachers, for the most part German naturalists.

An astronomic observatory, founded at the same time, holds an honorable position amongst similar institutions, and has already done work of primary importance by the publication of a chart of the southern heavens. Cordoba also possesses a meteorological institute, an academy of science, and various other learned institutions. The atlas bearing the name of Seelstrang is in course of preparation at the geographical bureau.

Formerly Cordoba was greatly exposed to the ravages of torrents overflowing their banks. A lateral branch of the Rio Primero, issuing from a gorge nearly always dry, sent down at times sudden avalanches of mud and slush. A *murallon* or dam constructed in 1671 still holds back the storm waters, and a similar work on a colossal scale was recently undertaken to embank the Rio Primero. A barrage erected at the issue from the mountains near *San Roque* arrested the flood waters, and regulated the discharge, both for the supply of the city and for irrigation purposes. Above this dyke, which is no less than 100 feet broad at the base, and over 16 at the top, and 344 feet long, a navigable lake would have been created with a depth of over 116 feet, a superficial area of 6½ square miles, and a capacity of over 9,000 million cubic feet. It would, in fact, have been the largest artificial basin of the kind in the world.

But, as has so often been the case elsewhere, the contractors had tried to effect savings by the use of an inferior mortar for cementing these cyclopic walls, and

* Knight, *op. cit.*, p. 157.

dangerous fissures made their appearance in the barrier. The level of the lake had consequently to be limited to 70 feet, which corresponds to a capacity of 2,000 million cubic feet, a quantity still sufficient for the irrigation of at least 100,000 acres. In 1890 a single downpour of six hours' duration caused three-fourths of the contents of the reservoir to escape, bursting a canal, by which the city was laid under water, and several hundred houses destroyed; fortunately most of the inhabitants were able to effect a timely retreat.

In the neighbourhood is the settlement of *Pueblito*, inhabited by Indian half-breeds, who since its foundation have always remained under the direct control of Cordoba. Farther up in the heart of the mountains is the health resort of *Cosquin*, frequented during the fine season by consumptive and other patients. A railway, running from Cordoba by San Roque and Cosquin up to the sources of the Rio Primero, and descending westwards to the salinas of Rioja, traverses a formerly productive mineral region, which now yields but little of the precious metal. Hence the Cordoba mint, which coined the gold from these mountains, has long been closed. *San Pedro* and *Dolores*, the chief places in the mining district, now depend on the agricultural resources of the surrounding plains.

TOWNS OF THE PROVINCE OF BUENOS AYRES.

The province of Buenos Ayres, in which is situated the capital of Argentina, comprises less than a tenth part of the domain of the Republic. But its advantageous position has enabled it to take a much higher rank in respect of wealth and population. In the fertility of its soil, and even in its climatic conditions it cannot compare with many other provinces; but it enjoys the primary advantage of easy access to foreign trade and immigration.

But not satisfied with its economic preponderance, Buenos Ayres has long aspired to political supremacy. In shaking off the yoke of Spain, its inhabitants expected to take the place of the metropolis as the centre of authority, and forthwith began to issue orders to the other sections of the colonial empire. Such was the cause of the civil wars between "unionists" and "federalists," which have cost torrents of blood, and which for a time even divided Argentina into two separate States.

CITY OF BUENOS AYRES.

The city to which its founder, Mendoza, gave the name of *Puerto Santa Maria de Buenos Ayres*, is not a natural "puerto" (haven), despite its name and despite the term *Puertenos*, "Harbour Folk," applied to its inhabitants. On the long, low-lying strand of the estuary there are no deep inlets of any kind, and the spot chosen for the settlement offered to the first arrivals nothing but a rocky hard, or landing-place for the boats of the vessels which had to ride at anchor in the offing.

Even at present, despite the artificial port, basins, breakwaters, and other recently completed harbour works, Buenos Ayres is scarcely distinguished from the uniform contour line of the horizon ; masts, funnels, towers, all appear, seen from the estuary, as if rising above a floating island. Without hills, or any broken ground rising more than 60 feet above the surface, Buenos Ayres can present no imposing or conspicuous object to visitors arriving from any point of the compass. The streets, laid out in the monotonous chessboard fashion of so many American cities, stretch away in interminable straight lines, unbroken by any natural obstacle causing a change of direction. Towards the south alone the regularity of the geometrical plan is somewhat interrupted by the scarps of a terrace, which fall abruptly towards the *Riachuelo*, the " Brook," as the neighbouring rivulet is called. A little variety in the quadrilateral blocks of houses has also been introduced by the railway lines and stations, and some other structures.

Although its site was one of the first to be chosen for a Spanish settlement, Buenos Ayres is not the oldest city in the Republic. In 1535, that is, eight years after the erection of the fortress of Espiritu Santo, near the mouth of the Carcaraña, Diego de Mendoza penetrated into the *Riachuelo*, and erected a few huts on the terrace dominating this streamlet. But being unable to maintain friendly relations with the Querandi Indians, he soon found himself blocked with his soldiers and settlers in his narrow camping-ground. Assaults and conflicts followed with varying success ; but the little colony failing to shake off the enemy, Alvar Nuñez broke up the settlement in 1542, when the district was restored to the Indians.

Repulsed in this direction, the Spaniards turned their arms in the direction of the Parana and Paraguay rivers, where the natives had submitted without much show of resistance. But the progress of the whites in the interior rendered all the more indispensable the foundation of a trading place on the shores of the estuary. It seemed rash to attempt to gain a footing in the vicinity of the warlike Charruas of the Banda Oriental, hence it was decided to recover the position abandoned on the *Riachuelo*. In 1580 Juan de Garay, at the head of sixty soldiers and a troop of Indian auxiliaries, resumed possession of the terrace at Buenos Ayres. The Querandi natives had at the time withdrawn from the district, and the leaders at once set about distributing the land.

The establishment of a commercial station at the entrance to the vast fluvial basin of La Plata could not fail to affect the interests of the old trade routes. The merchants of Cadiz and Seville, who enjoyed a monopoly of the traffic with the New World by the New Grenada and Peruvian routes, exacted from the Government the monstrous condition that European goods destined for La Plata should be forwarded by the way of Peru and the Upper Paraguay.

Nevertheless, Buenos Ayres managed to secure a few concessions, while the contraband trade was rapidly developed by the establishment of a Portuguese colony at Sacramento on the opposite side of the estuary. But the place developed very slowly, and in 1744, over a century and a half after its foundation, the population still fell short of 20,000. It continued to languish till the year 1776,

when the Platean territories were severed from the political and commercial supremacy of Peru, and constituted a separate viceroyalty in direct dependence on the home Government. By the close of the eighteenth century Buenos Ayres was already a large city with 50,000 inhabitants, and as many more in the surrounding district.

Although wars and civil strife were ushered in with the period of political independence, Buenos Ayres never ceased to develop, and since European immigration has assumed the character of an exodus, the capital of La Plata, till recently inferior to several other places in South America and to the two chief cities of Australia, now ranks as the largest centre of population in the whole of the southern hemisphere.* At times local revolutions, epidemics, and financial crises have occasioned a temporary falling off; but the normal yearly increase by the excess of births over the mortality ranges from 10,000 to 14,000, and to this must be added a share of the general immigration, estimated at about one-fifth of all the passengers landed.

The city, covering a very large area in proportion to its population, extends for a space of about ten miles along the river, from *Belgrano* to *Barracas*, and for about the same distance from the estuary towards the inland plains. North westwards a long suburb stretches away in the direction of the Parana; westwards several quarters are advancing towards *San José de Flores*; in the south continuous lines of houses reach all the way to *La Boca* and *Barracas* on the banks of the Riachuelo, and the whole municipality comprises a space of about 70 square miles; but the ground actually covered by structures is not more than 18 square miles, or about half the extent of Paris. Since 1870 Buenos Ayres, like Rio, Monte Video, and all the other large South-American cities, has been amply supplied with tramways, which do a relatively larger business than those of European towns. Six local railways also radiate from the quays to several urban stations.

Before the creation of colossal fortunes by trade and speculation, all the streets and all the houses were very much alike. As regulated in colonial times by a formal enactment of the Council of the Indies, the streets had an average width of 16 *vares* (45 feet), and formed *manzanas*, or blocks, 430 feet on all sides, with footpaths about three or four feet wide along both sides of the roadway. The normal type of dwelling, modelled on those of Cadiz and Seville, presents to the street an apartment with two windows, and a railed vestibule giving a view of the shrubs and flowers of a *patio*, or inner court, surrounded by chambers.

Formerly the houses had only one storey, or often merely a ground-floor. But the increasing value of the land, about the same in the central quarters as that of European capitals, has induced the ground landlords to build upwards, as the busy quarters—in the east near the harbour, in the north near the Palermo park and the fashionable Belgrano district—are being gradually reconstructed

* Population of Buenos Ayres, July 31, 1893 : 569,122.

with loftier and more sumptuous houses, no longer modelled on the old Andalusian type.

But since Buenos Ayres has fallen into the hands of the contractors and builders, it has begun to assume more and more the composite and commonplace aspect of most other modern capitals. Except brick and sand, the soil of the district yields none of the materials employed in the construction and embellishment of its buildings. The banks vie with each other in the display of imported marbles and metals, and the two English banks are really fine structures, which would be an ornament to any city. Granite and mica schists come from the island of Martin Garcia; the marbles from Italy; the flagstones of the side-paths and courts are brought by English vessels; the lime is prepared on the banks of Uruguay and Parana rivers; the ordinary timber is felled in Norway and Canada, while Brazil and Paraguay forward the costly cabinet woods, and France most of the furniture, bronzes and mirrors.

The chief monuments are concentrated near the shore on the spot where Juan de Garay erected his first humble habitations. The *Casa Rosada*, now the Government palace, near the custom house, was the old viceregal fort, often restored and entirely rebuilt towards the close of the sixteenth century. Close by the Mayo or Victoria Square is lined by the palace of Congress, the Town Hall, Exchange, Colon Theatre and the Cathedral, with its ambitious peristyle of Corinthian columns. At this central quarter begins the still unfinished Boulevard de Mayo, a spacious thoroughfare which is to intersect the Callao Boulevard in the centre of the city. Near the Mayo Square is also situated the great terminal station, whence radiate most of the lines of the Argentine railway system.

All nationalities have their representatives in Buenos Ayres, the great "crucible" in which the Argentine nation is being ground and amalgamated. In this Babel of races and languages the natives are not even in a majority, and in 1892 they constituted no more than a fifth of all the citizens. At that time the Italians were twice as numerous, and in some quarters little is heard except the Genoese, Neapolitan, or other Italian dialects.

Buenos Ayres cannot be called a healthy city, and although the birth-rate exceeds that of some large European capitals, the mortality is also very high, over 24 per thousand in 1891. The new drainage system had not been begun before the two great epidemics of cholera in 1867 and yellow fever in 1871, the former of which carried off 15,000, the latter as many as 26,000 victims. The works, which have already cost £6,000,000, are still far from complete, four-fifths of the houses not having yet been connected with the main sewer 16 miles long, which discharges into the estuary near *Quilmes*, east of the city. The water supply is obtained about a mile above Belgrano from a part of the estuary which, though quite fresh, is charged with sediment. The water is conveyed by a tunnel nearly four miles long to the reservoirs of *La Recoleta*, just north of the city. But the daily supply, about 15,000,000 gallons, is inadequate, and in 1893 as many as 10,000 out of 40,000 houses were still without water from this source.



BUENOS AYRES—CONGRESS BUILDINGS.

There are also numerous artesian wells, some sunk in 1860 to depths of 800 or 900 feet; but the water is too brackish to be of any use for domestic purposes. Since then the freshwater has been tapped which communicates with the Rio Parana at depths of from 84 to 100 feet below the surface. In 1884 as many as 150 of these wells had already been opened, the most copious yielding over 1,400 cubic feet per hour. These underground reservoirs seem to be inexhaustible.

To meet the increasing demands of the shipping in a seaport concentrating in itself three-fourths of all the trade of the Republic, more than one attempt has been made to improve the approaches and create a good artificial harbour. At first the mouth of the Riachuelo, where Mendoza had moored his caravals, was embanked, and the entrance dredged deep enough to admit vessels drawing 16 feet; the dredging is still in progress, and will ultimately attain a depth of 18 or 20 feet.

Another project, on a much larger scale, begun in 1887, consists in constructing along the whole frontage of the city four basins 23 feet deep protected by a granite breakwater, and provided with warehouses, cranes, and railways. When fully carried out, this scheme, which has already cost nearly £8,000,000, will give to Buenos Ayres a harbour incomparably superior to that of Monte Video. Instead of anchoring in the middle of the estuary 16 miles from the city, most of the large vessels already avail themselves of three of the basins completed in 1893, or of *La Boca*, "the mouth," as the port of Riachuelo is called. In the last century, the channel not having yet been buoyed, vessels sailed on the estuary only during the day, preceded by two pilot boats taking the soundings, quaintly compared by Muratori to hounds on the scent ahead of the sportsman.

The imports not only comprise manufactured wares and other goods required for the local demand and for the interior, but also the plant and raw materials for distilleries, flour mills, foundries, tanneries, and other industries bolstered up by prohibitive tariffs at the expense of the consumer. In exchange are forwarded wools, provisions, cheese, maize, and other produce.

Although well supplied with theatres, music halls, and such-like resorts of pleasure, Buenos Ayres, apart from a few little gardens and some promenades planted with trees, has only one park, the Palermo, situated on the shore of the estuary near the fashionable quarters on the road to the suburban districts of *Belgrano*, *San Isidro*, *San Fernando*, and *Las Conchas*. This magnificent public garden, traversed by a superb avenue of palms, possesses some fine botanical and zoological collections.

The University, which occupies the site of the old Jesuit College, contains the National Library of 60,000 volumes, and the Museum founded in 1823 by Rivadavia, and for many years administered by the naturalist, Hermann Burmeister. This museum possesses a most valuable paleontological collection, and amongst other remarkable objects a meteorite which fell in the province of Entre-Rios in 1880, and which contains carbon substances.

THE CITY OF LA PLATA.

La Plata, capital of the province of Buenos Ayres, owes its origin, not to individual enterprise, but to administrative exigencies. The municipality of Buenos Ayres having been "federalised" by Act of Parliament, the seat of the provincial Government had to be transferred to some place beyond the municipal limits. Some already existing town might have been chosen; but it was thought preferable to start fresh with a "ready-made" city on the open pampas, provided from the first with all the comforts, sanitary requirements, and refinements of modern culture.

Fortunately, an excellent site was selected in a healthy district near the *ensenada* (inlet) of *Barragan*, the best haven on the whole coast. The Spaniards had frequented the roadstead for two centuries, and on several occasions harbour works were constructed for the convenience of shipping. Within the new municipal district, comprising an area of 60 square miles, there already existed two little towns, *Tolosa*, with extensive railway works, and *Ensenada*, on the *Barragan* inlet, with a collective population of 8,000.

La Plata, which occupies a central position in the municipality, made rapid progress at first. Within eighteen months of its foundation in 1882, the chief provincial administrations were already established in palaces resplendent with gildings, marbles and cabinet-work. The census, taken every year, indicated an extraordinary increase, sometimes exceeding a thousand a month.

Then came the inevitable reaction. After the official buildings were completed, when the contractors, builders, and gangs of workmen had to be discharged, a financial crisis added to the difficulties caused by the stoppage of the works, and it was discovered that the co-existence of two large administrative centres 30 miles apart was too great a burden for the economic condition of Argentina. The principals, bound to reside near their respective bureaus, regretted the attractions of the neighbouring capital, with its theatres, its places of amusement, its restless political and social life, its varied pursuits, busy streets and noisy traffic.

Nevertheless, the dullness of *La Plata* cannot fail soon to be relieved by the growth of local industries, and meantime this city has acquired some importance as a scholastic centre. The chief buildings dedicated to science and instruction have been erected in the middle of a shady park or in the vicinity. Such are the Agricultural and Veterinary Schools, the Observatory, well furnished with excellent instruments, and especially the Museum, founded in 1884 by the explorer and naturalist, Francisco Moreno, and enriched with his valuable collections and library. Since then the zeal of a numerous band of explorers has added greatly to its treasures. The whole series of geological formations, the stratified layers abounding in fossils, the burial-grounds of hundreds of extinct tribes, have furnished a surprising quantity of rare objects, all methodically classified, which in certain branches of paleontology and archæology give the *La Plata* Museum the foremost place amongst such institutions. The very

ground on which the city stands has yielded skeletons, chipped stones, worked bones, and other human remains.

ENSENADA—TANDIL—BAHIA BLANCA.

The port of La Plata, the ancient *Ensenada*, 5 miles from the centre of the capital, has realised the hopes of its founders. Its principal basin, 3,670 feet long and 160 feet wide, is 20 feet deep at low water, and is accessible at flow to the largest vessels. But the merchandise here landed is destined almost entirely for Buenos Ayres. The chief drawback to the port and neighbouring city is

Fig. 175.—LA PLATA MUSEUM.



caused by the Buenos Ayres drainage system, which has its outlet near Quilmes, and which threatens eventually to choke the harbour with its pestiferous deposits. Nevertheless as a seaport, Ensenada has a double advantage over Buenos Ayres. It is reached by a buoyed channel rather under four miles instead of nine miles in length; wharfage dues are also much lower, owing to the fact that the provincial government has expropriated all the foreshore for the harbour, quays, docks, and wharfs. But in wet weather the place presents a dismal appearance, all the thoroughfares being transformed to almost impassable quagmires.

East of La Plata there are no towns properly so-called in the neighbourhood of the estuary. *Magdalena*, the most important place in the district, lies 3 miles inland, but possesses a few saladeros at the port of *Atalaya* on the coast. Pleasure-seekers and invalids from Buenos Ayres resort in the season to the favourite watering-place of *Mar del Plata*, which lies near Cape Corrientes, 250 miles by rail from the capital. Other watering-places are springing up farther north

near *Mar Chiquita*, and on the south coast near *Necochea* at the mouth of the Rio Quequen.

The railway connecting Mar del Plata with Buenos Ayres passes *Chascomus*, "Lake Town," so named from the surrounding lagoons, beyond which follow the stations of *Dolores* and *Maipu*, with a branch at this place running to the picturesque town of *Tandil* (650 feet), at the issue of a broad gap in the range stretching in the direction of Cape Corrientes. This pass of Tandil was the

Fig. 176.—MOUNT TANDIL AT CAPE CORRIENTES.

Scale 1 : 2,000,000.



gateway through which the predatory Indians penetrated into the plains of Buenos Ayres. Hence, in 1822, a fort was erected at this strategical point.

Some miles from Tandil is seen the famous *piedra movediza*, or "logging rock," an erratic boulder weighing 270 tons, poised at a single point of its broad base on a steep granite cliff. Although it sways in the wind, according to a local tradition a team of thirty oxen failed to upset it. This block was sacred in the eyes of the Indians, and is still regarded with awe by the Gauchos. On January 1st, 1873, a band of about 100 natives made it their trysting-place on an

expedition against the Europeans of whom some forty were massacred. Tandil supplies Buenos Ayres with marbles and other building materials.

Farther north the town of *Azul*, formerly *Cahufu*, both terms meaning "blue," lies midway on the line between Buenos Ayres and *Bahia Blanca*; in respect of trade and population, Azul is at present the chief place in this inland region. The whole of the pampas from the Plate estuary to Bahia Blanca has already been divided into allotments separated by wire fences. Everywhere the land has its owner; yet outside the towns few people are met, and little seen except the flocks and their shepherds. Nevertheless Azul and its western neighbour *Olavarria* are

Fig. 177.—ERRATIC BOULDERS OF TANDIL.



surrounded by settlements cultivated by peasants of all nationalities, but especially Danes and Russian Mennonites.

The districts of the province west of Buenos Ayres in the neighbourhood of the Parana and about the inter-oceanic railway, are the most thickly peopled of all the pampas regions. Several thriving places follow along the lines of railway, amongst others *Lobos*, *Veinte y Cinco de Mayo*, *Mercedes*, *Chivilcoy*, *Chacabuco*, *Junin*, *Pergamino* and *Arrecifes*. Here were first discovered, in 1766, the remains of the great pre-historic animals of Argentina. A megatherium forwarded to Madrid enabled Cuvier, from its description alone, to classify this gigantic species in the animal series.

Southwards follows *Trenque Lauquen*, which was formerly one of the strongest strategical posts on the Indian frontier. South of this place and of the chain of forts connecting it with the natural "moat" formed by the *Guamini* lakes, settlers are still but thinly scattered over the region of hills and lagoons, which forms the watershed between the Rio Salado and the Patagonian rivers.

BAHIA BLANCA—CARMEN DE PATAGONES.

Groups of population become more numerous in the direction of *Bahia Blanca*, a place which seems destined for a great future. In 1828 a fort was first erected,

Fig. 178.—CHAINS OF LAKES AND FORTS.

Scale 1 : 1,400,000.



not on the sandy bay, but some 6 miles off, near the morass where the Rio de Naposta runs out. The first settlers, three Swiss, arrived in 1863, and they were soon followed by immigrants of all nationalities. But before 1882 no European steamer had touched at the port, and at that time the sailing vessels engaged in the local traffic represented a yearly burden of not more than 6,000 tons.

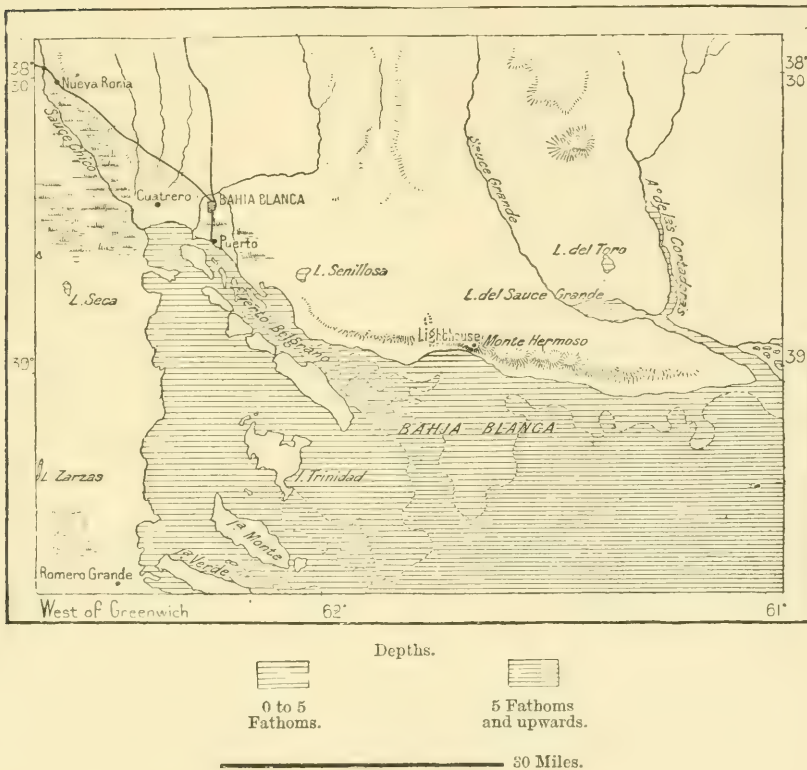
Bahia Blanca, that is, "White Bay," enjoys exceptional advantages. The harbour, lying about 4 miles from the town, is perfectly sheltered by a chain of islets, and even at low water has a depth of 33 feet, and of 16 feet close up to

the landing stage. Surrounded by vineyards, which yield the much esteemed *Chocoli* wine, Bahia Blanca enjoys a climate analogous to that of West Europe, and corresponds in latitude to that part of Chili between Concepcion and Valdivia, where the plants of the temperate zone thrive best. It is connected with Buenos Ayres by two railways and a weekly service of steamers. It also trades directly with the European seaports, and holds the first links in the chain of railways by which this seaboard will ultimately be connected with the upland valleys of the Rio Colorado and with the Chilian harbour of Valdivia.

Bahia Blanca receives its supply of water by a canal derived from the Rio

Fig. 179.—BAHIA BLANCA.

Scale 1 : 1,400,000.



Naposta, and from two artesian wells sunk in the district between the town and the estuary to the respective depths of 790 and 886 feet. But although drinkable the water from this source is charged with a certain quantity of salt, which it is hoped may be got rid of by more closely cementing the sides of the wells.

Extensive swamps, especially in the direction of *Cuatrero*, have already been drained seawards and the slush replaced by the pure water of irrigation canals. These hitherto unproductive tracts are now covered with gardens and fields.

The great territorial division, which takes the name of *La Pampa*, and which is traversed by the Rio Salado as far as Lake Urre Lafquen north of the Rio

Colorado, has Bahia Blanca as its natural outlet and future metropolis. *General Acha*, so-named from one of the military captains of Argentina, is its present capital. The district is studded with lagoons and laid out in grazing-grounds.

A diligence, which crosses the Rio Colorado at the fort of *General Paz*, traverses the desert between Bahia Blanca and *Carmen de Patagones*, or simply *Patagones*, which was founded by Viedma in 1779, and which was long the advanced outpost of civilisation in the inhospitable solitudes of the south. *Patagones* stands on the left bank of the Rio Negro 21 miles above its mouth, at the foot of the steep plateau escarpments which here present the aspect of cliffs. A fort erected above the town served till recently as a refuge in case of alarm for the few squatters who had ventured to establish themselves in the territory of the Tehuel-che Indians.

In the early days of independence, during the war between Brazil and Argentina, three vessels manned by imperialists made their appearance at the bar of the Rio Negro. The men landed to seize the fort, while the vessels attempted to ascend the stream. But one was stranded on an island at the entrance, another ran aground half-way up, and when the third came in view of the fort they found that their 500 comrades had surrendered, overcome by thirst and half dead with fright at a drove of about a thousand savage horses driven against them by the 70 defenders of Carmen. Thereupon the remaining vessel also struck her colours, and was immediately broken up by the riverside people.

Since then the inhabitants have brought the surrounding district under cultivation, and the surviving Tehuel-che Indians, having made their submission, have settled down near *Viedma* on the opposite side of the river. Steamers from Buenos Ayres touch regularly at the station of Carmen, despite its dangerous approaches.

Fortunately the much more convenient harbour of *San Blas*, surveyed by a hydrographic commission in 1883, lies not far off, about midway between the Colorado and Negro estuaries. Should the country ever get thickly peopled, San Blas will become the natural outlet for the produce of both valleys. The buoyed channel giving access to the port has a depth of 23 feet at ebb, and from 28 to 36 at flow. Viedma, so named in honour of the founder of Carmen, is quite as large and a pleasanter place of residence than its neighbour. It has been chosen by the Argentine Government as capital of the Rio Negro territory. Between the two settlements the rapid and dangerous river has a breadth of about 820 feet.

TOWNS OF PATAGONIA—HUCAL—JUNIN DE LOS ANDES.

The territory of Neuquen, which is separated from the province of Mendoza by the Upper Colorado, and in which the Rio Negro receives nearly all its affluents, can scarcely be settled except from the Chilian side of the Cordilleras. On the Atlantic slope facing the stony plains the communications must remain too long and too difficult, at least until good roads or railways are constructed from the coast to the foot of the Andes.



GENERAL ACHA—STREET VIEW.

To reach the Neuquen district from Buenos Ayres the traveller has first to take the railway as far as Mendoza under the mountains, and then the diligence to San Rafael, beyond which point the journey has to be continued for some 300 miles on foot or on horseback, over hills and valleys, across torrents and almost trackless forests. Or he may take an alternative route by starting from the station of *Huacal*, a settlement in the wilderness communicating by rail with Bahia Blanca. Beyond Huacal the track crosses the solitudes to the Rio Negro, which may then be followed to the region of its head-streams.

A few military posts founded in the Upper Neuquen basin have served as so many little centres of colonisation, and a number of stockbreeders have established themselves in the neighbourhood. In the Rio Limay valley also the zone of pastures has already received some settlers, and here vast tracts of land have been conceded to the officers of the military expedition, by which this region was first occupied in 1865.

Chos-Malal, administrative capital of the territory, forms a little cluster of houses at the confluence of the Leubu with the Neuquen, where the main stream begins to be navigable for small craft. *Norquen*, another little settlement about 18 miles to the south-west, stands on the banks of the Rio Agrio, which here escapes from a breached crater. In the immediate vicinity are seen the *Copahue* thermal and mineral springs bubbling up at an altitude of 10,000 feet, and at temperatures varying from 104° to 207° Fahr.

Farther south *Junin de los Andes*, the *Huinca Mellen* of the Indians, has been founded at an elevation of 2,230 feet in the Rio Chemen Huin Valley within view of the magnificent cypress and beech forests, which have already been attacked by the woodman. The lumber is floated down in rafts to Carmen de Patagones. Junin has the advantage of lying near a relatively low pass over the great Cordillera leading directly down to Valdivia, chief market of these Andean settlements.

The whole region from San Rafael to the Nahuel-Huapi is the "Switzerland of Argentina," a land of majestic mountains, of bright Alpine vegetation, of limpid running waters. Near the Lonquimay volcano, commanding one of the more frequented passes between the Neuquen and Biobio Valleys, a geyser of blue water is ejected to a height of about 50 feet from an extinct crater whose encircling margin is now covered with ice.

Below this upland basin the few stations on the Limay, and lower down on the Rio Negro proper to the neighbourhood of its estuary, are all of military origin. This rainless zone has naturally failed to attract free settlers, although *Roca*, below the Neuquen-Limay confluence, stands on an alluvial plain extremely productive wherever capable of irrigation. But the canals run dry in summer, and the fields are often ravaged by locusts. A small steamer ascends the river from Carmen to Roca during the floods, from July to February.

Beyond the Rio Negro in the direction of the south follows the valley of the Chubut, which has scarcely any white settlers except near the estuary. Since 1888, however, a few English, Chilian, and Argentine cattle-breeders have

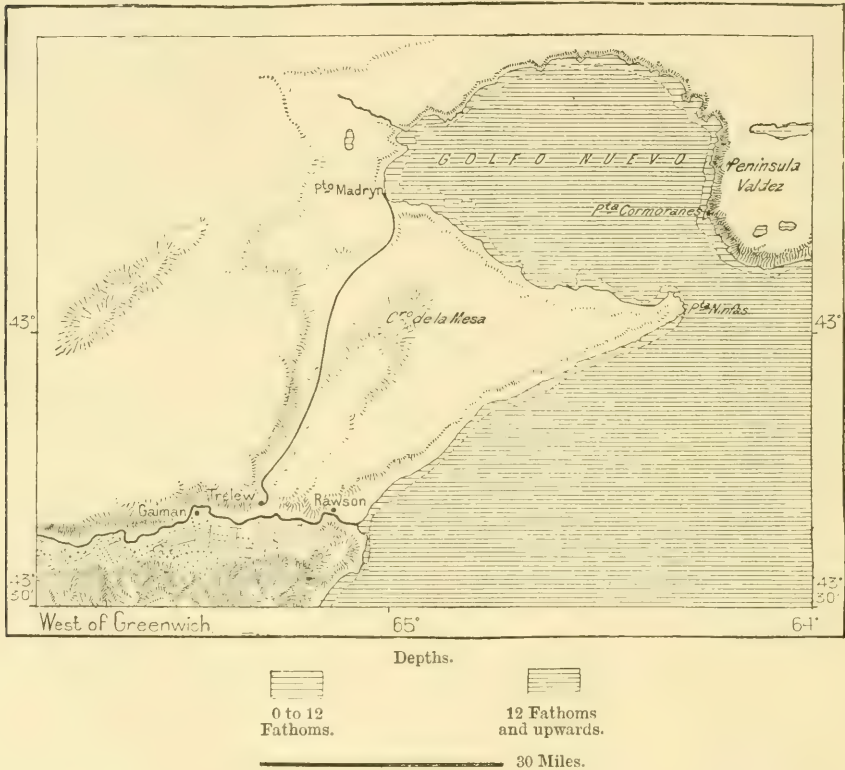
established themselves at the foot of the Andes in the Corcovado Valley, near which are some auriferous deposits.

NEW WALES.

The colony, which sends out its pioneers to this almost uninhabited though highly fertile region, has been founded at the other extremity of the fluvial basin close to the Atlantic coast. On the representations of a fellow-countryman who had visited Patagonia, 132 Welsh people landed in 1865 on the shores of the vast

Fig. 180.—WELSH COLONY OF CHUBUT.

Scale 1 : 1,500 000.



circular basin of Golfo Nuevo, where the *Port Madryn* pier projects into the bay. From this point they reached the banks of the Chubut by an overland route across the wilderness, and forthwith set about the work of colonisation, building cabins, tilling and sowing the ground.

But all were either quarrymen or coal-miners, unaccustomed to field operations. The crops were wretched in this arid Patagonian region where rain seldom falls, and where at times the soil remains unrefreshed by a single shower for two or three years together. Fortunately these persevering settlers were men of kindly feeling, and soon made friends of the Tehuel-che Indians, who supplied them with food, such as game, fish, wild berries from the mountains in exchange for bread and a few little articles of English manufacture.

Nevertheless the Welsh colony must have eventually failed had it not occurred to some of the inexperienced squatters to dam up the current of the Chubut when swollen by the melting snows, and distribute the water through irrigation rills over the land. "New Wales" was saved. The plain, forming a long triangle 48 miles east and west with a mean breadth of 5 miles, comprises a

Fig. 181.—OLD AND MODERN COLONIES IN PATAGONIA.

Scale 1 : 16,000,000.



superficial area of about 100,000 acres, of which one-third is under wheat, the concessions varying from 250 to 375 acres.

The soil, consisting in great measure of volcanic ashes watered by a network of irrigating canals with a total length of 230 miles, yields excellent returns despite the ravages of wild swans and duck. The crops are sevenfold more abundant than those of the old settlements in this region, and after supplying

the local demand from 1,500 to 2,000 tons of corn remain for exportation to Liverpool. The Chubut wheat has the reputation of being the very best in South America. A railway 46 miles long runs from the banks of the river across the sandy plateau to Port Madryn. Besides tillage, cattle farming is successfully carried on, and the colony already owns 30,000 horses, sheep, and cattle.

Consisting originally of a few Welsh starvelings, the colony now comprises over 3,000 souls, including some more recent English, Italian, and Argentine settlers. In the community there is neither a single pauper nor a single policeman, and leisure is already found to cultivate the arts, and to keep alive the study of the old Welsh language. In the census returns mention is made of pianos, harps, and violins, as well as of ploughs and harrows. As in the home country, the colonists have remained faithful to their religious traditions; each sect has its chapel, and all are zealous observers of the Sabbath.

Rawson, capital of the territory, lies on both banks of the Chubut, which is here spanned by a wooden bridge. But the position is inconvenient, since all attempts have been given up to utilise the estuary, and since the colony is connected by rail with the Golfo Nuevo. *Trelew*, 9 or 10 miles higher up, forms a depôt for the produce of Rawson, and here are the headquarters of the co-operative society which enables the settlers to procure European wares almost at cost price.

PUERTO DESEALO—USHUAIA.

Along the coast as far as Magellan Strait follow a few camping grounds, sites of future towns. Such are *San Julian*, *Santa Cruz*, humble capital of the territory, *Gallegos*, and *Cabo de las Virgenes* with its auriferous deposits. Owing to its rigid climate and thankless soil, the colonists have abandoned *Puerto Deseado*, which, nevertheless, enjoyed considerable advantages in its good roadstead and favourable position under a projecting headland midway between the Chubut estuary and Magellan Strait. In 1586 Cavendish had settled some English families at this point, and in 1669 Great Britain sent out fresh colonists, making the settlement capital of Patagonia, which had been proclaimed a British possession.

At the close of the eighteenth century, Viedma erected a fort and hoisted the Spanish flag at Puerto Deseado, which the Argentine Republic afterwards utilised as a penal settlement. The outlay for every family till recently maintained on this bleak and arid coast by the treasury was estimated at no less than £15,000. In 1890 a solitary French family still lingered on the spot.

A group of gold hunters have established themselves in Fuegia on the shores of San Sebastian Bay. The settlement stands at a point giving access to a region of pastures, which proves to be considerably more productive than had been commonly supposed, and which even affords facilities for tillage, despite the burrowings of the *tucu-tuco*.

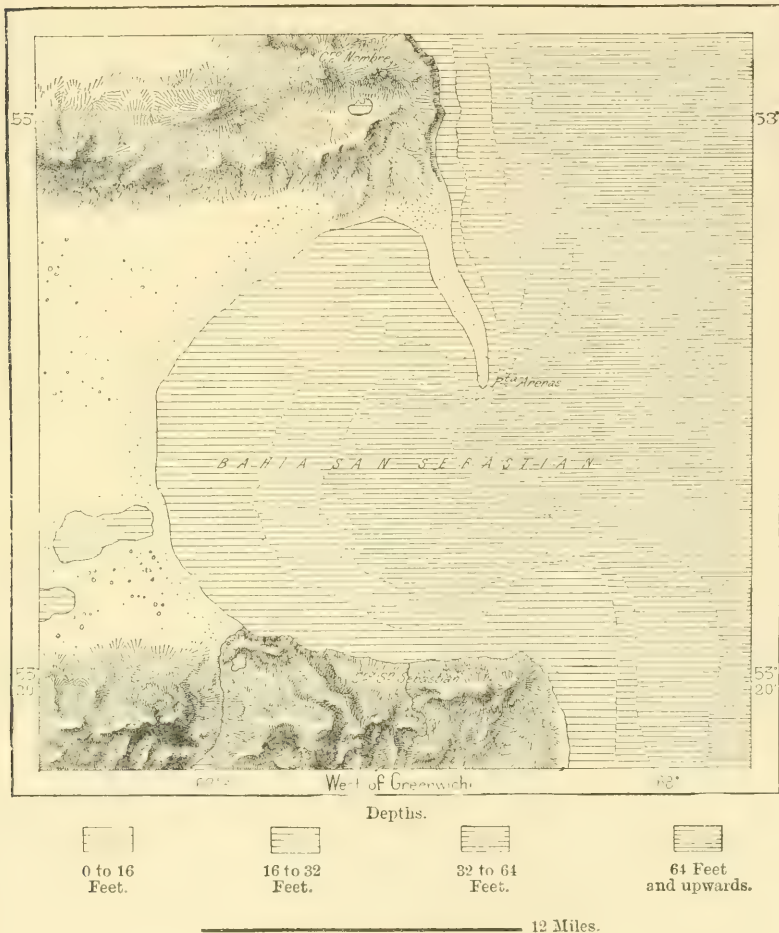
Farther south, on Beagle Channel, is seen the little group of houses at *Ushuaia*, another territorial capital which, according to the last census, contained 76 inhabitants, "all officials." This southermost settlement on the surface of the globe

is also one of the dreariest, a place of winds, and rains, and storms, and utter desolation.

Staten Island, a rocky ridge 3,000 feet high, lost amid the storm-tossed waters of the Austral Sea, had been granted to a stock-breeder, who failed to profit by the concession. The only inhabitants are the men in charge of the lighthouse, which has been erected on Cape San Juan. But the Argentine Government is credited

Fig. 182.—SAN SEBASTIAN BAY.

Scale 1 : 500,000.



with the intention of transforming Staten Island to a great penal settlement—a Plateau Sakhalin.

MATERIAL AND SOCIAL CONDITION OF ARGENTINA.

Since the War of Independence the population of Argentina has steadily increased, despite the revolutions of the federalist and centralist factions, and despite the brigand conflicts honoured by the name of "civil wars," which have so long wasted certain provinces, and which have so often been re-kindled like

smouldering embers. At the close of the Spanish rule, the vast region now forming the Argentine Republic had probably not more than 400,000 inhabitants, whereas the first census taken in 1857 returned as many as 1,837,500, exclusive of about 100,000 Indians.

Since that time no general census has been taken, but a total of over 4,000,000 may be inferred from a study of the local statistics. But even this is insignificant compared with the vast extent of the territory. Doubtless only a few scattered groups of settlers could find support on the elevated Andean plateaux, the salinas (salt wastes) of the central provinces, or the arid stony steppes of Patagonia.

But the Parana-Uruguay Mesopotamia, the Missions, the north-western plains and valleys, the Cordoba uplands, the Pampas grazing grounds, lastly, the upper valleys of all the rivers flowing to the Atlantic, constitute a domain at least 400,000 square miles in extent, where even 100,000,000 human beings would constitute but a small population, regard being had to the immense resources of the land. By natural increase such a number could scarcely be attained in a period of four centuries, at least according to the present rate of growth. As far as can be judged from the scanty data available, the average mortality would appear to be about two-thirds of the births, which corresponds to a yearly increase of not more than 50,000.

IMMIGRATION.

But since the middle of the nineteenth century this increase has been doubled and in favourable years even tripled by the swelling tide of immigration. In 1889 over 289,000 were landed at Buenos Ayres, and of these as many as 250,000 remained in the country. Larger views are entertained on this subject in Argentina than in Brazil, till recently a land of slave labour, and despite local jealousies, immigration is regarded in the Platean regions as a recruiting ground of future fellow-citizens. So early as 1811, one year before the abolition of the slave trade in Buenos Ayres, Rivadavia spoke of attracting foreign settlers, "not only to increase the labour market, but as an element of civilisation."

During the first decade no returns were made of the foreigners who came to found new homes in the Argentine lands; but since the year 1857 a regular census is taken of all the immigrants arriving at Buenos Ayres, either directly or by the route of Monte Video. After deducting the number of emigrants from the country, and the probable mortality of the unmarried amongst the new arrivals, during the first years of their residence, statisticians have concluded that the Republic has been enriched to the extent of about a million permanent settlers in Argentina.

Moreover, thousands and thousands making their way to the Transatlantic seaboard by other and more expensive routes, but not classed in the category of immigrants, have also established themselves in the La Plata regions. Nor must those Chilian settlers be overlooked who cross by the passes of the Cordilleras down to the eastern slopes, and who already constitute the great majority of the Andean population within the Argentine frontiers.

While increasing the population as a whole, the new arrivals cause an apparent relative lowering of the birth-rate, owing to the excess of male over female immigrants. In Buenos Ayres, Santa Fé, and Entre-Rios the disparity is as much as 20 per cent. But the Italian element, at present by far the largest in the general movement, is also the most prolific. In the Argentine regions the birth-rate is stated to rise to 60 per 1,000 in Italian families, compared with 40 per 1,000 in French, and still less in native households. In some years the mortality would even appear to exceed the births in Argentine families residing in Buenos Ayres. The native element would thus seem to have already lost somewhat of its vital force, so that the growth of the nation would be arrested were the race not constantly renewed by a strain of foreign blood. The phenomenon is somewhat analogous to that which has been observed in New England and the other parts of the United States that were the first to be colonised. In the Argentine Republic, as well as in Paraguay, more females than males are said to be born in the Creole families.

Next to the Italians, who form one-third of the new arrivals, follow the Spaniards, French, English, Swiss, and Germans (amongst whom many Slavs from the eastern provinces) in the order named, and since 1891 over 6,000 Jews from Russia, Austria, and Palestine. Most of the immigrants being of Romance (Neo-Latin) speech, the adoption of the Spanish language presents no difficulty. It also appears that over nine-tenths are Catholics by birth, and that about one-third can neither read nor write.

Naturally the great majority remain at or near the ports of arrival, such as Buenos Ayres, Rosario, Santa Fé. But throughout nearly the whole of the Republic Europeans find a suitable climate, and need to avoid only the marshy, malarious, or goitrous districts. Tetanus causes many deaths, and ring-worm is also common, owing to the habit of eating raw or half-cooked meat. Leprosy carries off a few victims, and Buenos Ayres has been visited by yellow fever, introduced from Brazil; but this scourge has not made its appearance in recent years, thanks to the improved quarantine and sanitary regulations. Small-pox and consumption also carry off many victims; but some of the remote, thinly-settled regions are remarkably free from maladies of any kind, and there is a local saying, probably not to be matched in the whole world, that, "Once in a hundred years a man dies in Patagonia." It has, however, been suggested that the proverb may owe its origin to the fact most people in Patagonia meet with some violent end.*

STOCK-BREEDING.

Agriculture, properly so called, is of recent origin in Argentina. Where cattle roamed the pampas in thousands and millions, the scanty groups of population had little need to dig and delve, the less so that they lived almost exclusively on a flesh diet. An ox was slaughtered for the sake of the tongue, and no trouble was taken even to save the hide; the carcass was at most used as fuel in the

* W. H. Hudson, *op. cit.*, p. 126.

brick-fields. Later, the cattle-owners derived a sufficient revenue from the sale of the hides, the *tasa* or jerked meat, and the animal black obtained from the combustion of the bones. Nothing could be more primitive than the management of the Argentine *estancias*, or cattle-farms. The animals lived throughout the year under the canopy of heaven, and after being duly branded, were practically left to themselves. Thus they reverted to a half-wild state, and when wanted had to be captured, like game, with the lasso. The bola was even occasionally used for the purpose.

After the introduction of the horse by Solis, horned cattle arrived by the Paraguay route. In 1550 an envoy of Irala, returning from Peru, brought back some sheep and goats, and three years afterwards, the brothers Gões came into Paraguay from São Vicente with a bull and eight cows. From this stock, originally from the South of Spain, have descended the millions of oxen that now people the savannas of the Platean Republics. In these regions the European breed has lost none of its natural qualities, and appears to have undergone scarcely any change. The new environment suits it as well as the old, and it retains its characteristics throughout Argentina for a space of over 1,200 miles, from North Chaco to the plains of Bahia Blanca.

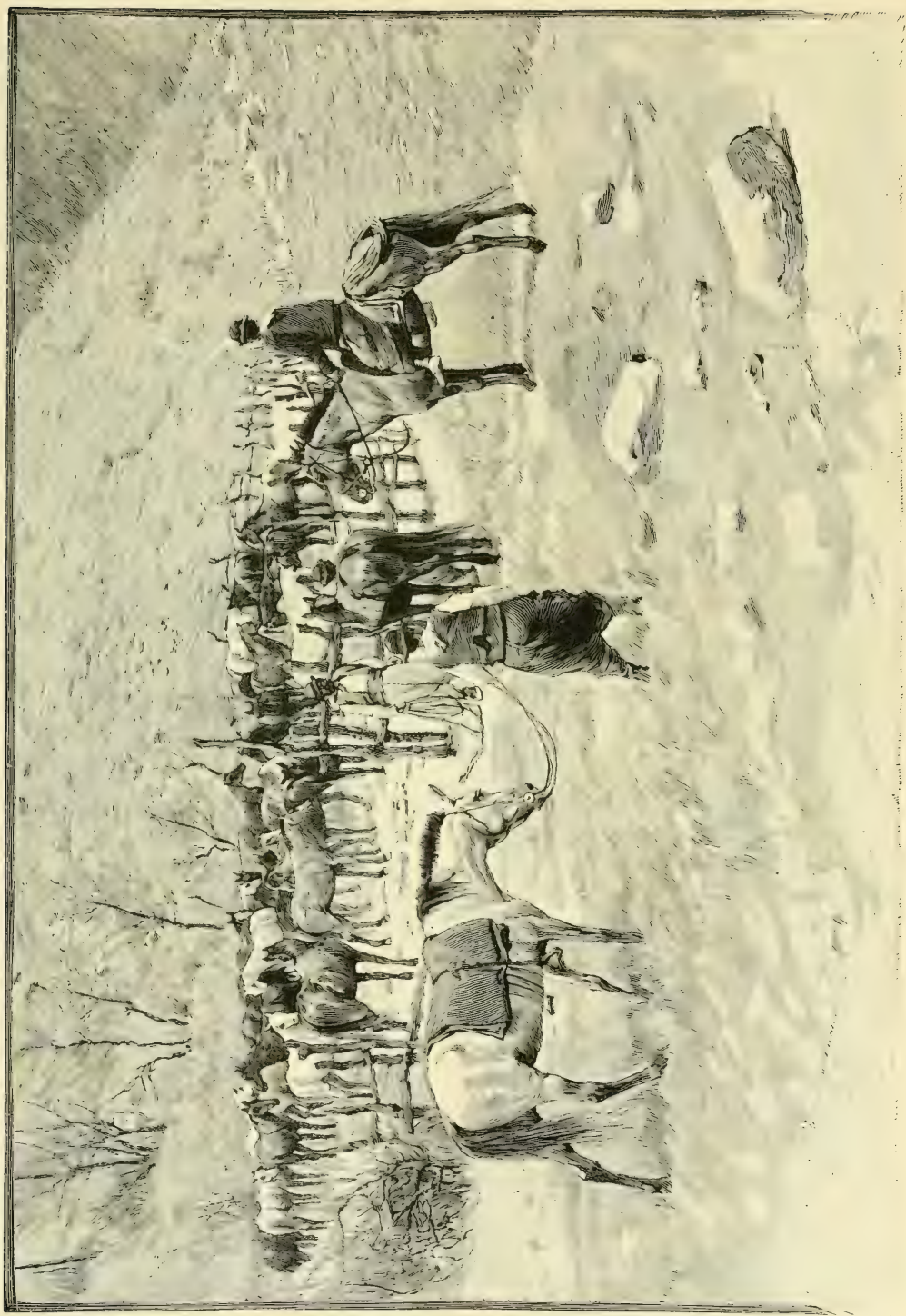
The size, however, is modified by the quality of the pasturage, the animal being small in the arid Catamarca districts, larger in the rich prairie lands of Entre-Rios, while the finest breed is that of Miranda from Matto Grosso. On the plains all multiply prodigiously, a well-managed herd doubling every three years. The *alzados*, that is, the animals which had run wild, increased even at a still more rapid rate, and these were hunted by the Spaniards of the pampas only for their hides. The process, which was carried out in a very rude and barbarous way, has been suppressed since the settlement of the country, and at present nearly all the herds have again been domesticated.

In the lower Rio Negro valley, the swine have also reverted to the wild state, without increasing or decreasing in numbers. Hudson relates a pathetic story of a runaway cow, which became a sort of foster-mother to a drove of wild pigs in an island of the Rio Negro, where all lived together in a happy family till "the fame of the cow that had become the leader and queen of the wild island pigs was spread abroad in the valley."* Then somebody took a musket loaded with ball and shot the queen in the midst of her body-guard.

The *baguales*, or wild horses, have become even rarer than the *alzados*; few are now met except in South Patagonia, where they are scarcely pursued, except as game by sportsmen. As mounts they are worthless.

Of Arab stock, crossed by the Andalusian variety, the Argentine horse is as a rule very docile, hardy, and of great staying power. But till recently little attention was paid to its points of beauty, and it is still of small size with very large head. Mules are also bred, especially in the province of Cordoba. Formerly these animals were exported to Peru to work in the mines; at present they are raised chiefly for the Bolivian and Chilian markets. Throughout the upland

* *Op. cit.*, p. 59.



CORRAL IN THE PROVINCE OF PATAGONES.

regions the mule is almost exclusively employed for all purposes, being more sure-footed and hardier than the horse. But hitherto little attention has been paid to the improvement of the breed. The mules which are now exported through Buenos Ayres to the Mascarenhas, to India, and in the opposite direction to the Andean provinces, are all raised on the coast-lands.

Sheep constitute with the horse and ox the chief animal wealth of Argentine, and even tend to take the foremost position. Under the colonial administration they had increased enormously, although at that time possessing but little market value. In the interior a few Calchaqui women used the wool to weave some coarse textiles: but the flesh was not even eaten, but left to the dogs and vultures, while the bones were used for making lime.

Spain had interdicted the importation of the merino breed, which was not introduced till long after the declaration of independence. But since 1830 a large number of English and other breeders have improved the native varieties, and by crossings with various European breeds have obtained new types of sheep as well as of horses and cattle. The best wools are yielded by those that graze on the short grasses of the north-western provinces, and especially of the puna region in Jujuy. Here the sheep is associated with the llama, an animal not met in any other part of Argentina.

All the other European domestic animals have been introduced, and thrive well even without any special care. Dogs and cats, which have reverted in thousands to the wild state; pigs, goats, rabbits, and poultry of all kinds are met everywhere. Both the South American and the African ostrich have succeeded in some farms; but the industry has not acquired the same importance that ostrich farming has in the Cape. Larks and other singing-birds have been let loose on the pampas, and the European bee thrives in Entre-Rios. But it may be asked whether it would not be wiser to utilise the native species. Various honey-yielding insects swarm in Gran Chaco and in the province of Santiago del Estero, where they still give rise to a considerable industry. The Indian *meleros*, or honey gatherers, make long journeys of days, or even weeks together, in quest of the combs deposited by the bees or other melliferous insects in holes or on the branches of trees. At times they fell entire woods in the search. Hence it is to be feared that the valuable honey-makers may disappear altogether before sufficient knowledge has been gained to regulate their work and prepare suitable hives for their reception. Meantime apiculture, in the strict sense of the word, has made but little progress. There are a few hives here and there, but in certain provinces the introduction of the domestic bee appears to have been forbidden as injurious to the fruit-trees.

Although in recent years tillage has encroached on pasturage, just as sheep-farming has been developed at the expense of cattle-breeding, the Argentine provinces of Entre-Rios and Buenos Ayres, together with the conterminous Republic of Uruguay, still possess more cattle and horses in proportion to the population than any other region of the globe. In respect of sheep they rival, and, in some districts, greatly outstrip Australia itself.

AGRICULTURE.

Agriculture proper had at first a hard struggle, having to contend especially with the pastoral habits and traditions of the rural populations. In Entre-Rios the first land was broken up in obedience to the peremptory orders of the all-powerful Urquiza. But these orders were of little effect, and the natives took advantage of the least political disturbances to abandon their fields and orchards and resume their nomad pastoral life.

Nevertheless, the revolution, which the will of one man had failed to bring about, was accomplished by the new economic conditions of Europe and the New World. When animal products began to acquire a market value, even in the Argentine Mesopotamia, the land itself rose in price; it was classified according to the nature of its produce, and agriculture, at first developed in the neighbourhood of the towns, gradually took possession of the more fertile regions. The arrival of thousands and tens of thousands of foreign settlers coincided with the economic transformations of Argentina and gave them a fresh impetus.

In 1891 the extent of land under cultivation was estimated by Brackebusch at nearly 12,000 square miles, or rather more than the hundredth part of the whole territory. Wheat and maize are by far the most important cereals, and these alone cover over two-thirds of all the tilled land. Next follows alfalfa, or lucerne, which is grown especially on the artificially irrigated lands of the west, and which already forms a leading article of exportation.

The other vegetable products are confined to very small areas, mostly in the province of Buenos Ayres, which supplies the capital with provisions of all kinds. In fact, one-third of all the land under tillage lies within the limits of this province. Santa Fé, largely occupied by foreign settlers, follows next in importance, after which comes Cordoba, which, however, grows scarcely anything except wheat and potatoes. Notwithstanding its admirable position and general advantages, Entre-Rios takes only the fourth place, while the neighbouring and equally favoured Corrientes stands nearly at the end of the list, after Mendoza, San Juan, Tucuman, and San Luis.

Nearly everywhere the farmers have to dread the plague of locusts, which at times present themselves in serried ranks sixty miles broad. In general the yield of wheat is far below the average of most other agricultural regions. Even in Santa Fé, most fertile of the pampas provinces, it scarcely exceeds four or five bushels per acre, which in France or England would be regarded as little better than a total failure of the crops. Argentina produces much wheat, not because of its fertility, but because of its great extent.

Sugar, next in importance to the cereals, is confined exclusively to the sub-tropical zone, and even here to the bottom lands, forming a narrow belt which extends from Oran, near the Bolivian frontier, to Tucuman and Santiago del Estero. Cotton, which yielded good returns, has been nearly abandoned, while in the same zone the vine is cultivated up to a height of 6,500 feet. The chief wine-growing districts are in the neighbourhood of San Juan and of Mendoza, where viticulture has acquired real importance. The total annual yield is

estimated at 13,500,000 gallons, or about as much as the foreign importation, but not more than one-fifth of all the liquors consumed under the name of "wine." From the grapes, as well as from sugar-cane, maize, and other produce, spirits of various kinds are distilled.

Corrientes yields a tobacco resembling the finer Paraguay varieties. The other more important products of the fields and gardens are olives, bark, potatoes, European fruits, and vegetables. Some of the fruits thrive well, and the apple has even run wild, especially about the old Indian Missions in the "Manzanas" region, on the slopes of the Andes, where the natives extract a *chicha*, or cider, from the fruit.

LAND TENURE.

Land tenure is of various kinds. In some places the old system of great domains still prevails, while medium or small holdings have been formed in the eastern provinces under the influence of the foreign settlers. Such holdings already existed in Tucuman, where, in 1882, the freeholders numbered as many as 7,150, in a total population of not more than 120,000. In certain remote districts of Buenos Ayres vast estates belong collectively to the scattered members of a single family, who enjoy the right of settling and grazing their cattle in any unoccupied part of the common domain. But this communal system is no proof, as might at first be supposed, of any hearty union between the different branches of the family circle. It merely attests the great obstacles which the litigious spirit of the associates throws in the way of a friendly distribution of the patrimony.

In the province of Jujuy traces still survive of the old *encomiendas*, another name for Indian slavery. A few families of these Coyas serfs have succeeded after sanguinary revolts in recovering their lands and their freedom; but all are not yet emancipated, and some of the great landowners may still claim to be absolute masters of enormous estates comprising whole mountains and valleys with all their inhabitants. Often the so-called political revolutions of the far interior are nothing more than conflicts between these great *estancieros*, who arm their vassals and retainers against each other. These landless serfs, who have no hope of ever acquiring an acre of property, live in great misery, overburdened with debts due to their paramount lords, and leading a dreary existence to which the risks of a "civil war" may come as a welcome diversion.

Even in the eastern provinces, notably that of Buenos Ayres, the greater part of the soil is distributed in vast estates, so large as to be usually measured by the "square league," that is, about 10 or 11 square miles. A single capitalist acquired at a stroke a domain of 900,000 acres in the pampas at the upset price of £440,000.

But such vast estates were far too large to have any well-defined limits. The flocks ranged to a certain distance from their *querencia*, that is, the folds where they were gathered for the night. But the shepherds paid little heed to the exact boundaries of the conterminous runs, and even of ploughed lands. Thus

By the so-called "Colonisation Act" passed in 1876 on the model of the United States *Homestead-Bill*, the national domain was divided into squares of 12 miles on all sides, comprising 400 lots of 250 acres each. The first hundred arrivals received their lots gratis, and the rest was then sold at the rate of two dollars the hectar ($2\frac{1}{2}$ acres); to prevent the creation of large estates it was decided that nobody could purchase more than four lots. Colonisation Companies were to arrange for the introduction of settlers; but after a few experiments, for the most part unsuccessful, this system was abandoned.

Since 1887 "agricultural centres" have been established in the province of Buenos Ayres round about railway stations distant at least 60 miles from the capital, and to these estates the law of expropriation is applied in the case of all absentee owners. In three years over 250 villages have been founded on this plan, representing altogether about 5,525,000 acres of arable land.

In 1888 the province of Santa Fé, which has received the largest number of settlers, comprised over 190 colonies with upwards of 6,500,000 acres. In nearly all these colonies each settler is allowed to acquire as many *chacras* (lots) as he has means to purchase, and of these he becomes the absolute owner. Property on the communal principle of collective ownership exists only amongst the "Russified" Germans, Mennonites, or others on the east side of the Parana. Here the Russian *mir* has been introduced, and is even said to have acquired a more decidedly communistic character.

MINERALS—INDUSTRIES—TRADE.

Mineral products constitute but a small portion of the national wealth in the land of "Silver." Even in favourable years they scarcely exceed £280,000, although certain gold, silver, lead, and copper mines are very rich in ores. But they are all situated in mountainous regions of difficult access, and in the Andean provinces of the north-west they are often blocked by snow in winter. The coal-fields of San Rafael and of the foothills appear to constitute the chief mineral wealth of the Republic; but mining operations have scarcely yet begun in these rugged districts.

Taken as a whole, the industries are but slightly developed. Till recently they were confined to the production of articles of primary necessity connected with the alimentation, housing, and clothing of the people, everything else being imported from Europe and the United States. The only important industry was directly associated with stock-breeding—the preparation of meat, hides, and the like. Weaving had even retrograded since the Indian women had ceased to make stout coarse fabrics from various raw materials.

But the sudden penury caused by the financial crises and bankruptcies has compelled the Argentines to develop a number of industries, which were not needed so long as there was plenty of money to buy all they required in Europe. Thus have recently sprung up breweries, sugar refineries, paper mills, and various other factories, provided with the best plant and managed by skilled hands.

Being favoured by the facility of transport across the level plains, the trade of

Argentina has acquired a surprising development during the last decades, though not to the extent represented by misleading official returns. According to Mulhall the real annual movement of exchanges in recent years, marked by a great commercial crisis, has been about £32,000,000, and in 1889, the most prosperous year, £38,000,000; altogether the collective trade represents a sum of from £8 to £10 per head of the population. In this movement Great Britain takes by far the largest part, followed (1891) by France, Belgium, Germany, Brazil, and the United States in the order named. But since 1892 this order has been disturbed, and at present Germany ranks before Belgium.

Nearly all the exports are either animal products or agricultural produce, while the imports include textile fabrics, wines and alimentary substances, machinery, hardware, coal and petroleum. About two-thirds of the foreign trade are centred in Buenos Ayres.

Navigation with foreign countries, including the coast and fluvial services with Uruguay, has increased nearly five-fold during the last decade, and to this must be added the development of the river navigation in Argentina itself. Steam has taken by far the largest part of this increase, and Great Britain takes the first place in the shipping returns, the national flag following next in order of importance. A single Navigation Company owns no less than 120 steamers plying on the rivers of the interior. On the great navigable arteries many English and other ship-owners hoist the Argentine flag to avoid the heavy harbour dues which are levied on foreign craft. According to a legal fiction of the local administration, the course of the Uruguay itself is regarded as an "ocean," at least in the section between Concordia and Salto. Thanks to the railways, however, the right bank along the Entre-Rios district is being rapidly transformed to a continuous wharf, busy with sea-borne traffic.

COMMUNICATIONS—RAILWAYS—EDUCATION.

The era of railway enterprise began in 1857 by the construction of a metropolitan line running from Buenos Ayres to the south-western suburb of Flores. But at first progress was slow in the Platean regions, where the easy natural routes across the level pampas rendered railway communication less urgent than in other American countries. Before the introduction of wheeled traffic, travellers for whom time was an object traversed the solitudes with a whole drove of horses led at a gallop by a mare, whose tinkling bells brought the *tropilla* to a stand at every station. When his mount was tired, the rider sprang into a fresh saddle, and so the pace was kept up from post to post, and distances of 70 or even 90 miles were covered in a single day. But for merchandise conveyed by pack-mules, or in lumbering carts, the day's journey rarely exceeded 24 miles, and in disturbed districts the convoy had to outspan at night and form lager against a possible surprise by predatory Indians.

Then followed the coaching days, when diligences and other vehicles with long teams of horses crossed the plains at full speed, tearing through the tall grasses and dense patches of thistle, scarcely slackening the pace to descend and

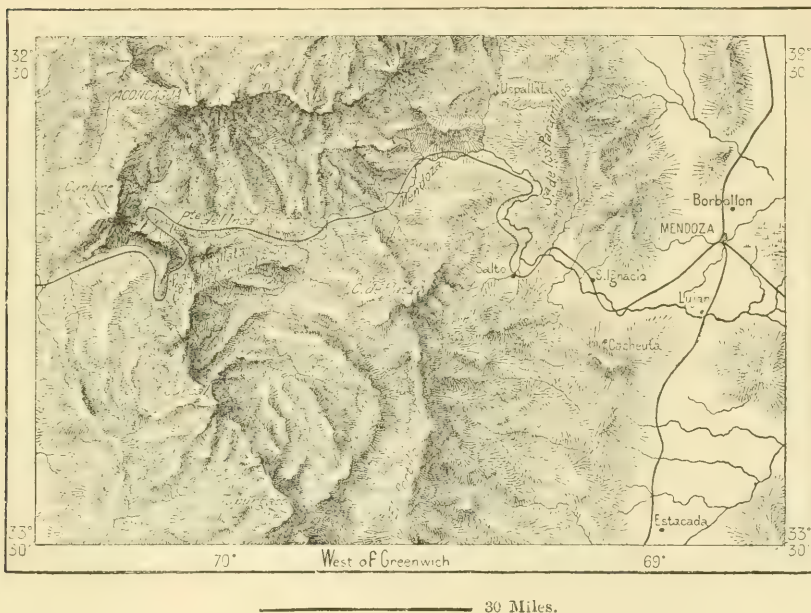
mount the high river banks and cross the streams with the water up to the axles of their enormous wheels.

But these resources, adequate for a rudimentary traffic, had to give way to steam when the transport trade began to acquire a serious development. The growth of railway enterprise thus corresponds to that of material progress in other directions, and at present the Argentine system rivals that of several European States; compared with the respective populations it even exceeds them all, Belgium not excepted. But compared with the extent of the territory the proportion is less favourable to Argentina, where the population is thinly scattered over a region of vast extent.

The lines are distributed very unequally over this region. Round the two

Fig. 184.—ROUTE OF THE TRANSANDINE RAILWAY.

Scale 1 : 1,800,000.



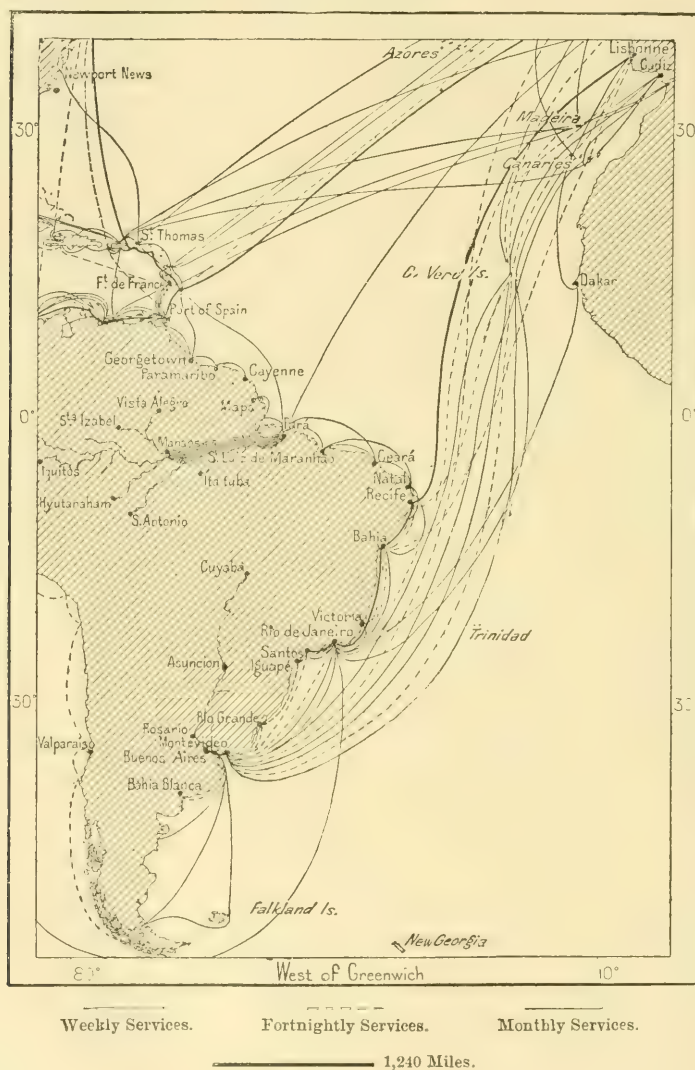
chief centres, Buenos Ayres and Rosario, they radiate in all directions, and also afford concurrent routes parallel with the great navigable artery of the Parana. But the northern provinces are not entirely traversed as far as the Bolivian frontier, while towards the west the passes over the Andes had not yet been reached in 1894. Southwards the system extends no farther than Bahia Blanca, beyond which in the whole of Patagonia there exists only the short line connecting the Welsh colony on the Rio Chubut with its port on the Golfo Nuevo.

On the whole the traffic on the Argentine railways is considerable, both as regards passengers and merchandise. But the cost of construction, averaging about £7,300 per mile, seems very high for a country needing so few cuttings, levellings, or other expensive works. This outlay, however, which is guaranteed by the State for one-third of the lines, is explained by reckless speculation, loans

at heavy interest, the administrative charges for boards of directors over 6,000 miles distant from the field of operations. In the province of Santa Fé, where the rapid settlement of the country insured immediate returns, the local Government was able to construct the first lines without spending a single penny. All that was needed was to issue coupons redeemable by the future profits on the transport trade.

Fig. 185.—LINES OF COMMUNICATION.

Scale 1 : 87,000,000.



The gauge varies with the different companies, ranging from 5 feet 6 inches on most lines, to not more than 40 inches on those of Santa Fé. It has been proposed to cut a tunnel under the Uruguay and the Parana, in order to establish direct railway communication between Buenos Ayres and Monte Video. At present the most serious engineering work in progress is a viaduct, over 2,200 yards long, crossing the Rio Salado at Molino de Balas.

The telegraph system has been developed even at a more rapid rate than the railways, while the postal service stands on nearly the same level of efficiency as that of most commercial European nations. But the correspondence consists largely of business letters, in which foreigners take a relatively larger share than the natives. About half of the whole correspondence is centred in Buenos Ayres, and the proportion was even higher some years ago.

Public instruction, despite considerable progress during the last decade, is

Fig. 186.—GENERAL VIEW OF LA PLATA.



still far from embracing all the youth of the country. About three-fourths of the schools and teachers belong to the State system of education. But the financial disasters which have occurred since 1890 have involved the closing of numerous establishments, and in several provinces the teachers have been discharged by the dozen.* The rate of attendance has been proportionately reduced from one-

* In August, 1894, as many as 330 public schools in every part of the Republic had to be closed for want of funds to maintain them.

third to one-fourth for the whole country. Each province has its national college, besides which there are normal schools, two agricultural schools, a school of mines at San Juan, and two universities—Buenos Ayres and Cordoba.

Excluding the ephemeral sheets, which are due to political rivalries and which disappear after every election, the periodical press comprises (1892) one hundred and seventy newspapers, of which twenty-four are dailies. Of the latter as many as fifteen appear in Buenos Ayres in the five more important current languages—Spanish, Italian, French, English, and German.

ADMINISTRATION.

The constitution of the Argentine Republic, as framed by the Santa Fé Convention of 1853, gives the State a federal representative form of government. Each of the fourteen provinces of the Confederation has its own administration, represented in six of them by two Chambers, and in the eight others by a single legislative body. But each province has also its governor or president, elected for a certain period, and assisted in some instances by a vice-governor. All adult male citizens enjoy the franchise for the election of the municipal bodies, the provincial legislatures, and Congress. All titles of nobility and prerogatives of birth are abolished.

Undoubtedly a chief source of the troubles and difficulties besetting the Central Government is the political status of the fourteen provinces. Each of these is practically an independent state, an *imperium in imperio*, framing its own laws for internal administration, often with little regard to the general interests. When the present constitution was adopted there were, no doubt, many reasons why the several provinces should enjoy the privileges of self-government. The distances were so great and the routes so difficult, that constant communication with the Federal Government was impossible, and some of the more remote regions had, in fact, to be left to themselves. But these difficulties have been removed by the development of the railway and telegraph systems, and a reform of the Constitution seems now urgently needed in the direction of greater centralisation. At present (1894) all the provinces except Entre-Rios are bankrupt, and a favourable opportunity is thus presented for the Central Government to take over the responsibility of the provincial debts in return for the abolition of the provincial organisation.

Non-naturalised strangers are admissible to the municipal functions, and enjoy all the civil rights of the natives, with freedom to exercise their trades and professions, to own real property, to navigate the fluvial waters, to practise their religions, to give evidence, and to marry in conformity with the general laws. They are not required to take out letters of naturalisation, or to pay enforced contributions of an exceptional character. Naturalisation, if desired, is obtainable by a residence of two years, and even sooner in case of eminent services rendered to the State. On the other hand the children of foreigners are required, at the age of twenty-one, to choose their nationality, having the option of retaining that of the father or of becoming Argentine citizens.

The national Congress, seated at Buenos Ayres, official capital of the Confederation, comprises two elected bodies. The Chamber of Deputies consists of representatives directly named by the inhabitants of the provinces and of the capital, in the proportion of one for every 20,000 or fraction of 20,000 above 10,000 of the population, and elected for four years.

The Senate, modelled on that of the United States, comprises two members for each province and two for Buenos Ayres, nominated for nine years and, like the deputies, re-eligible. In the provinces the senators are elected by a majority of the local legislatures; in Buenos Ayres by a junta of electors chosen in the second degree. The vice-president of the Confederation is *ex-officio* president of the Senate. The elections rarely express the real will of the people. Usually the influential classes assemble their clients, distribute the voting tickets, and lead them in battalions to the booths.

Both the president and the vice-president are chosen by a special body of electors for a term of six years. The president, who possesses the same sovereign powers as in the United States, is assisted by five ministers for the interior, foreign affairs, finance, public worship and education, war and navy. The president and the vice-president may both assist at the deliberations of Congress and take part in the debates, but cannot vote.

The Judiciary power of the Confederation is exercised by a Supreme Court of Justice, comprising nine judges and two procurators fiscal resident in the capital. In principle they hold office for life, "except in case of proved unworthiness."

Fig. 187.—TERRITORIAL DIVISIONS OF ARGENTINA.

Scale 1 : 31,000,000.



RELIGION—FINANCE.

Although all cults are free, the Roman Catholic clergy are subsidised, and the ecclesiastical hierarchy enjoys an official status. It comprises the Archbishop of Buenos Ayres, who must be a native of Argentina, and four suffragan bishops—Parana, Cordoba, Cuyo, and Salta. The clergy number about 650 priests and 200 monks of various orders employed in educational work. The priests are eligible to the different political bodies.

The army comprises in time of peace from 8,000 to 10,000 men with 1,700 officers; but in 1893 a bill was passed raising its strength to 15,600 men. There is an undue proportion of over-paid officers, while the rank and file fare badly. The national guard, drawn largely upon during civil strife, comprises over 400,000 men, that is, all able-bodied citizens between the ages of 17 and 45, with a reserve comprising all between 45 and 60.

The fleet consists of ironclads, gunboats, torpedoes, and transports, with 150 guns, 24,450 tons, and 1,500 sailors.

The finances of the Republic are in a deplorable state, the expenditure regularly exceeding the income, while the interest on the public debt already exceeds the annual revenue. The liabilities thus continue to accumulate, and are now excessive compared with the number of inhabitants, despite continual reductions of interest and pensions, and other retrenchments equivalent to partial acts of bankruptcy. The administration has at times been reduced to such straits that it has been unable to pay its gas bills, so that the companies have threatened to cut off the supply from the public offices.

The provincial finances are in the same plight, and Entre-Rios, which has an income of only £600,000, has a debt the annual interest of which amounts to £700,000. Collectively the national, provincial, and municipal debts exceed £120,000,000, and to this must be added the foreign charges on various so-called national undertakings. The railway companies are at present (1894) indebted to English capitalists to the extent of £50,000,000. As a set-off there are vast stretches of the public domain still unsold.

Each of the fourteen provinces is divided into departments, which comprise so many *partidos*, while the nine territories remain undivided into departments. The provincial authorities are directly elected by the people, but the President of the Republic appoints the territorial governors for three years, and these nominate the district justices of the peace. When a territory has a population of 30,000 it has a right to elect a legislature, and double that number entitles it to enter the Confederation as an "Argentine province."

In the appendix are tabulated the provinces and territories, with respective areas and populations.



CHAPTER XVIII.

FALKLAND ISLANDS AND SOUTH GEORGIA.



HIS archipelago, which rises from the Atlantic depths at a distance of 340 miles to the east of Magellan Strait, bears an English name, though not that of its English discoverer. The islands were first sighted by Davis in 1592, and he was followed in 1594 by Hawkins, who passed this way on his plundering expedition to the coast of Chili, and named the group the "Maiden Islands," in honour of Queen Elizabeth. Then came the Dutchman, Sebald de Wert, in 1598, who gave them his own name.

Nearly a century later, that is, in 1689, the navigator Strong dedicated them in his turn to his friend Falkland, and this name has prevailed, although the appellation of Malouines, due to a sailor of Saint-Malo, long figured on the French and Spanish maps. It was even retained by the Argentines, who claimed the archipelago as part of their domain, and gave it the official name of Malvinas.

In 1764 Bougainville took the first steps towards a permanent occupation, by letting loose some cattle in the archipelago; but he founded no colony properly so-called. Then the Spanish Government, becoming aware of the prospective value of these oceanic lands, wished to establish a military station on the islands. But this act of possession having been accompanied by high-handed proceedings against English subjects, the British Government at once protested, and in 1765 Admiral Byron arriving with a fleet formally reinstated his fellow-countrymen in the name of England, without, however, questioning any higher claims or pretensions of Spain. But it was undoubtedly a serious step, the more so that the English station of Egmont was at the same time erected on the bay of like name. This was obviously a precedent which might afterwards be appealed to as an act of formal possession.

After the War of Independence, however, the Argentine Republic, heir to the rights of Spain, took advantage of the fact that the English military post had meanwhile been abandoned, owing to the heavy cost of maintenance, and in 1828 gave a concession of the Falkland Islands to Louis Vernet, a stockbreeder. This

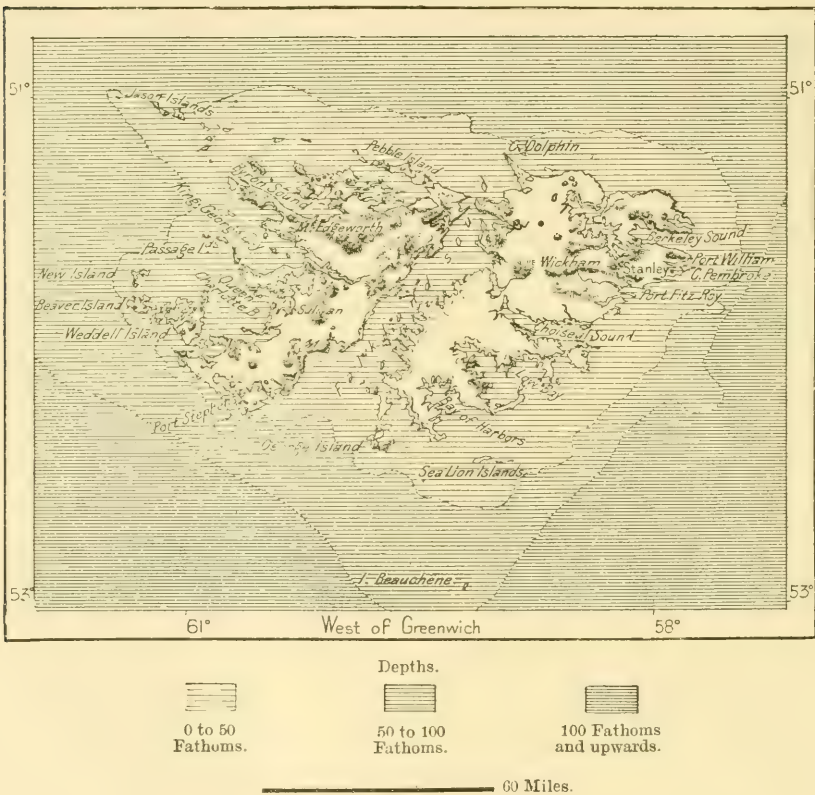
settler held his ground for three years, until the day when he rashly attempted to levy fiscal dues on some North American whalers. The result was that he received a visit from a United States corvette, which laid his village in ashes.

Two years after that event Great Britain resumed definite possession of the Falkland Islands, regardless of the protests made by Argentina against this annexation. Although a natural dependency of the South American Continent, the archipelago has thus become a British colony like part of the Guianas and the islands of Trinidad and Tobago at the other extremity of the mainland.

Although one of the least important lands in the vast colonial empire of

Fig. 188.—FALKLAND ARCHIPELAGO.

Scale 1 : 3,800,000.



Great Britain, this group of antarctic islands has, nevertheless, a certain value as a cattle run. But it is prized by its present masters more especially as a strategical position, keeping guard on the highway of communication between the Atlantic and Pacific Oceans.

Lying under 52° south latitude, that is, at the same distance south of the equator as parts of England and Holland north of the line, the Falklands might be supposed from their rigorous climate to be situated much nearer to the south pole. The polar aspect of these oceanic lands is even intensified by the mountains which

occupy the northern districts, and which attain in the culminating peak of Mount Adam an altitude of 2,320 feet.

It is obvious from the indentations of the coasts, the deep straits separating the two chief members of the group and the hundred clustering islets, and from the traces of ancient glaciers, that the Falklands are the remains of a coast region carved into fiords like the Magellanic lands. The crests of the hills also are all disposed in the same direction from north-west to south-east. In winter the resemblance is heightened by the snows which cover the uplands and whiten the plains for a few hours.

But the Falklands, being exposed to fierce gales, lack the arborescent vegetation which clothes the lower slopes of the Fuegian mountains. So violent are the winds that they are said at times to uproot and scatter like straw the very cabbages grown in the kitchen gardens of the settlers. Rains also are frequent, and, like the home country, the archipelago is often shrouded in fogs and mists, especially during the spring and autumn months; these, however, usually lift towards noon.

On the other hand the climate, being essentially oceanic, offers no great discrepancies between the extremes of heat and cold, and except for the blustering winds, it presents no features to which colonists from Great Britain are not accustomed. The climate of Port Stanley is even damper than that of London.*

Next to the sweet grass known by the name of tussock (*dactylis cespitosa*), on which the flocks fatten, the most prevalent vegetation are the mosses and lichens. A great part of the surface, even on the slopes of the hills, is carpeted with a turf indicating the presence of bogs, where it is difficult to lay down a single track. The quadrupeds are represented only by a few foxes; but aquatic fowl whirl in multitudes over the islands, the bays, and inland lagoons, and of these several species are easily tamed: Penguins are drawn up in battalions on the overhanging ledges in such numbers that the governor of the islands is nicknamed "King of the Penguins." Hundreds of thousands are annually killed for the sake of their oil. The fishers also capture some species of salmon and other fishes, and till recently pursued the whale, which has now become rare in these waters.

The animals introduced into the archipelago by Bougainville have multiplied. But by a remarkable contrast, which attests the influence of the environment on the gradual modification of species, the horses have become smaller and smaller with every successive generation, while the cattle have, on the contrary, increased in size.†

Nevertheless, stock-breeders reject the oxen and direct their attention almost exclusively to sheep-farming. In 1852 a syndicate of Uruguayan proprietors

* Meteorological conditions of the Falklands and South Georgia:—

	Latitude.	Temperature.		
		max.	mean.	min.
Port Stanley (Falklands)	51° 41'	76° Fahr.	43° Fahr.	12° Fahr.
Royal Bay (S. Georgia)	54° 31'	67° Fahr.	34° Fahr.	9° Fahr.

† Charles Darwin, *Voyage of the Beagle*.

and a fresh supply of provisions. An inlet in the harbour is full of dismantled hulks which were found too damaged to be worth while patching up again.

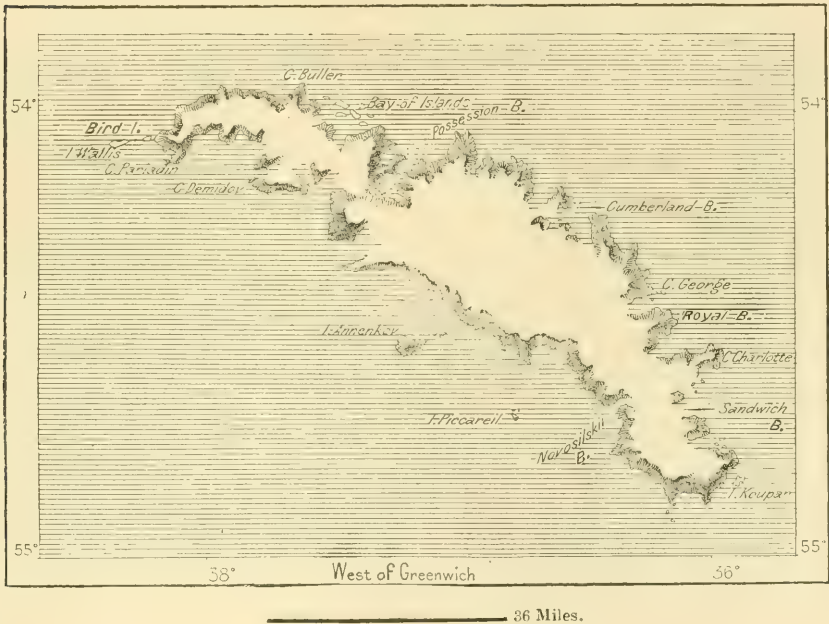
The administration of the archipelago is entrusted to a governor, directly appointed by the Crown, and assisted by a legislative and an executive council, also nominated by the Queen. Since 1892 the colonists have begun to take part in the government of the islands.

SOUTH GEORGIA.

South Georgia, about 1,600 square miles in extent, depends administratively on the Government of the Falkland Islands. But it is uninhabited, and only occasionally visited by fishers and sailors. Even its contour lines are not yet

Fig. 190.—SOUTH GEORGIA.

Scale 1 : 1,900,000 Miles.



accurately determined, and the surveys taken by the English and Russian navigators do not penetrate inland, nor, in some cases, even to the head of the bays and creeks.

The relief of the interior was unknown in the year 1882, when a German scientific expedition established itself at Royal Bay, at the eastern extremity of the island, to take part in the circumpolar studies, at that time undertaken by the leading maritime powers in connection with the transit of Venus. But the expedition confined its explorations to the immediate vicinity of the bay.

The island, above which rise snowy peaks ranging from 6,500 to 8,000 feet in height, consists exclusively of very old unfossiliferous formations, gneiss, and argillaceous schists, of difficult access from the sea. The cliffs have been worn by

glaciers, which have scooped out deep troughs in the less compact argillaceous masses, while leaving intact the peaks and headlands of harder gneiss formation. Frontal moraines are seen at the issue of the valleys formerly filled with crystal streams.

The Ross glacier, whose broken fragments float away across Royal Bay, is developed in a basin at least 50 square miles in extent. The lower limit of persistent snow descends to about 2,000 feet above sea-level.

The snowy peaks and headlands of South Georgia are constantly shrouded in fogs, and snow frequently falls even in February, the warmest month in the year. No tree grows in the island, and the German naturalists were unable to collect more than thirteen species of flowering plants; of these all but one are also found in the neighbouring Falklands and in Fuegia. The thirteenth belongs to the flora of distant New Zealand.

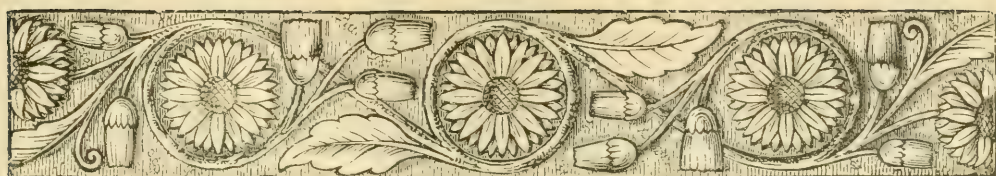
Mosses clothe all the inland plateaux and all the slopes facing the northern sun, while the rocky escarpments turned towards the south pole are destitute of vegetation. These mosses of the insular flora, which resemble the arctic forms, impart to South Georgia a physiognomy quite distinct from that of the other South American lands.

The fauna of the island comprises, besides various species of penguins, a solitary songster, a member of the lark family.

South Georgia lies under the same latitude as Tierra del Fuego, that is to say, considerably nearer to the antarctic circle than the Falklands. Its position is also far more isolated in the midst of the South Atlantic waters, remote from all the great highways of navigation, some 1,250 miles east of Magellan Strait, and in the direct track of the antarctic polar current. Hence the mean temperature is several degrees lower than that of Ushuia on Beagle Channel in Fuegia.

Nevertheless, the moist, stormy climate, being somewhat equable, is believed to be suitable for sheep farming, like that of the Falklands. The same nourishing tussock grass also grows up to an altitude of 1,000 feet. But on the other hand few settlers are likely to be attracted to such a dreary abode, a storm-tossed rocky prison, lost in the waste of waters on the verge of the habitable globe.

Farther south towards the antarctic pole, the southern seas, with their convoys of huge icebergs, sweep round the planetary surface, awaiting the future Scoresbys and Nansens, who are to lift the veil now concealing the mysteries of those unexplored solitudes.



APPENDIX.

STATISTICAL TABLES.

THE GUIANAS.

	Area in sq. miles.
Guiana contested by Great Britain and Venezuela . . .	52,000
British Guiana, including the region contested by Brazil . . .	50,000
Dutch Guiana	50,000
French Guiana	32,000
Guiana contested by France and Brazil	105,000
Total	289,000

APPROXIMATE POPULATION OF THE GUIANAS ACCORDING TO RACES (1893).

	British.	Dutch.	French.	Contested Coast.	Total.
Civilized Indians	1,000	200	400	2,000	3,600
Wild Indians	7,000	2,500	1,000	300	10,800
Bush Negroes	200	16,000	1,000	—	17,200
Other Blacks and Mulattoes	130,000	55,000	21,700	600	207,300
Hindus, Chinese, Malays	135,000	3,600	4,000	—	142,600
Portuguese and Brazilians	14,000	500	300	100	14,900
Europeans	4,800	750	100	100	5,750
Other Whites, Troops, &c.	1,000	1,450	5,700	—	8,150
Total	292,200	80,000	34,200	3,100	410,300

BRITISH GUIANA.

Approximate area, 102,000 sq. miles ; pop. (1893), 292,000.

Chief towns :—Georgetown, 56,000 ; New Amsterdam, 9,000 ; Bartica, 2,000.

Sugar plantations (1890), 80,000 acres.

Sugar crop (1891), 117,204 hogsheads ; value, £1,650,000.

Rum (1891), £267,000 ; molasses, £44,000.

Total value of sugar products (1891), £1,950,000.

Exports (1891), £2,532,000 ; imports, £1,710,000 ; total, £1,242,000.

Yield of gold (1884), £900 ; (1892) £160,000.

Shipping (1891), 647,000 tons.

Commercial fleet of British Guiana, 141 vessels of 6,625 tons.

Revenue (1890), £500,000 ; debt, £200,000.

Railways, 23 miles ; telegraphs, 275 miles ; telephones, 190 miles

DUTCH GUIANA.

Area, 50,000 sq. miles ; population (1893), 80,000.
 Paramaribo : population (1893), 28,800.
 Plantations : cacao, bananas, &c., 1,320 acres.
 Production of gold (1891), £135,000.
 Exports (1893), £360,000 ; imports, £500,000 ; total, £860,000.
 Shipping (1892), entered and cleared : 460 vessels ; 190,000 tons.

FRENCH GUIANA.

Area, 32,000 sq. miles ; population (1893), 25,000.
 Cayenne : population (1893), 10,600.
 Convicts at Saint-Laurent (1892), 1,105.
 Political exiles of Saint-Jean (1892), 1,237.
 Prisoners in the Islands du Salut (1891), 685.
 Agricultural produce (1889), £155,000.
 Imports (1889), £360,000 ; exports, £171,000 ; total, £532,000.
 Revenue (1893), £74,000 ; expenditure, £54,000.

BRAZIL.

	States.	Area in sq. miles.	Pop. (1888).	Est. Pop. (1894).
Amazonas		732,460	80,654	90,000
Para		443,653	407,350	450,000
Maranhão		177,566	488,443	500,000
Piauhy		116,218	266,933	300,000
Ceara		40,253	952,625	1,000,000
Rio Grande do Norte		22,195	308,852	320,000
Parahyba		28,854	496,618	500,000
Pernambuco		49,625	1,110,831	1,150,000
Alagoas		22,583	459,371	550,000
Sergipe		7,370	232,640	370,000
Bahia		164,649	1,821,089	2,000,000
Espirito Santo		17,312	121,562	200,000
Rio de Janeiro		26,634	1,164,468	1,300,000
Município Neutro (City of Rio)		538	406,958	530,000
Santa Catharina		27,436	236,346	250,000
Rio Grande do Sul		91,335	564,527	1,050,000
Minas Geraes		222,160	3,018,807	3,200,000
Matto Grosso		532,708	79,750	100,000
Goyaz		288,546	211,721	250,000
Parana		85,453	187,548	320,000
San Paulo		112,330	1,386,242	1,500,000
Total		3,209,878	14,002,335	15,950,000

CHIEF TOWNS OF AMAZONAS AND PARA (1893).

Manaos (Barra do Rio Negro)	50,000	Cameta	10,000
Teffé (Ega)	1,000	Santarem	2,000
Para (Belem)	110,000	Macapa	1,000

Average annual exports of Para (1880-93), £3,400,000.
 Exports of rubber (1892), 18,800 tons ; value, £1,800,000.
 Receipts of the Para Custom House (1893), £1,280,000.

CHIEF TOWNS OF GOYAZ (1893).

Goyaz, 8,000 ; Formosa, 3,000 ; Pyrenopolis, 2,500.

CHIEF TOWNS OF THE MARITIME STATES BETWEEN THE TOCANTINS AND THE RIO SAN FRANCISCO, WITH ESTIMATED POPULATION.

MARANHÃO.		RIO GRANDE DO NORTE.	
São Luiz	45,000	Natal	6,000
Vianna	11,000	Macau	5,000
Caxias	10,000	Ceara Mirim	4,000
Alcantara	5,000	Mossoro	3,000
PIAUHY.		PARAHYBA.	
Parnahyba	12,000	Parahyba	40,000
Therezina	10,000	Mamanguapé	10,000
Amarração	5,000	PERNAMBUCO.	
Oeiras	2,000	Recife (Pernambuco)	120,000
CEARA.		Nazareth	15,000
Fortaleza	30,000	Goyana	10,000
Aracaty	16,000	Palmares	5,000
Maranguapé	12,000	Carnaru	3,000
Sobral	10,500	ALAGOAS.	
Baturité	10,000	Maceio and Jaragua	15,000
		Alagoas	5,000

San Luis : exchanges (1892), £813,000.

Pernambuco : average exchanges, £8,000,000 ; sugar exported (1892), 23,472 tons ; Custom-house receipts, £1,100,000 ; shipping, from 1,600,000 to 2,000,000 tons.

CHIEF TOWNS OF THE SAN FRANCISCO BASIN, WITH ESTIMATED POPULATION.

MINAS GERAES.		BAHIA AND ESPIRITO SANTO.	
Ouro Preto	20,000	Bahia	200,000
Diamantina	14,000	Cachoeira	20,000
Januaria	10,000	Nazareth	8,000
Serro	7,000	Santo Amaro	7,000
Sabara	5,000	Itaparica	6,000
Pitangui	3,000	Barra do Rio Grande	6,000
Morro Velho	2,500	Carinhanha	3,000
SERGIPE.		Canavieiras	3,000
Aracaju	15,000	Caravellas	3,000
S. Christovão	5,000	Philadelphia	2,000
Propria	3,000	Ilheos	1,500
		Porto Seguro	1,000
		Victoria	20,000

Bahia :—Average imports, £2,000,000 ; exports, £1,800,000 ; shipping, 3,000 vessels, 1,700,000 tons ; Custom-house receipts (1892), £1,950,000.

CHIEF TOWNS OF THE STATE OF RIO DE JANEIRO, WITH ESTIMATED POPULATION (1893).

Rio de Janeiro	515,000	Barra Mansa	12,500
Nietheroy	36,000	Petropolis	12,000
Campos	27,000	Pirahy	12,000
Rio Bonito	21,000	S. Pedro d'Aldeia	11,900
Itaboraí	18,000	Macacu	11,500
Rezende	16,000	Sumidouro	10,500
S. Fidelis	14,000	Vassouras	9,500

Rio :—Coffee exported (1892), 236,000 tons, value £8,000,000 ; total exports, £9,600,000 : imports, £16,000,000 ; Custom-house receipts, £4,800,000 ; shipping, 5,352 vessels of 5,612,600 tons ; immigrants landed, 54,500.

CHIEF TOWNS OF THE PARANA BASIN AND ADJACENT SEABOARD, WITH
ESTIMATED POPULATION (1893).

MINAS.			
Juiz de Fora	15,000	Barbacena	6,000
Uberaba	12,000	Tiradentes	5,000
S. João del Rey	8,000	Caxambu	3,000
S. PAULO.			
S. Paulo	100,000	Rio Claro	8,000
Campinas	18,000	Ribeirão Preto	8,000
Santos	15,000	Itu	6,000
Taubaté	15,000	Faxina	6,000
Pindamonhangaba	15,000	Jundiahy	5,000
Lorena	11,000	Piracicaba	5,000
Guaratinguetá	10,000	Sorocaba	4,000
PARANA.			
Curitiba	6,000	Paranagua	3,000
SANTA CATHARINA.			
Desterro	15,000	Laguna	3,000
Blumenau	5,000	Joinville	2,500

Santos:—Average imports, £3,000,000; exports, £12,000,000; shipping (1892), 1,034 vessels of 537,000 tons; coffee exported, 150,000 tons, value £7,300,000; Custom-house receipts, £1,300,000.

Paranagua:—Shipping (1892), 376 vessels; maté exported, 19,350 tons, value £312,000.

CHIEF TOWNS OF RIO GRANDE DO SUL, WITH ESTIMATED POPULATION (1893).

Porto Alegre	52,000	Santa Cruz	6,000
Pelotas	35,000	Santa Anna	5,000
Rio Grande	23,000	Jaguarão	5,000
Bagé	22,000	Alegrete	4,000
S. Leopoldo	8,000	Itaquy	4,000
Uruguayana	8,000	S. Borja	2,500

Rio Grande:—Total exchanges (1891), £2,700,000; shipping (1891), 326,000 tons.

CHIEF TOWNS OF MATTO GROSSO, WITH ESTIMATED POPULATION (1893).

	Population.		Population.
Cuyaba	18,000	Sant' Antonio	4,000
Corumba and Ladario	7,000	Rosario	3,000
S. Luiz de Cáceres	4,500	Matto Grosso	1,400
		Diamantino	1,000

POPULATION OF BRAZIL AT VARIOUS DATES.

1776, 1,900,000; 1819, 3,617,000; 1872, 9,930,000; 1883, 12,600,000; 1893, 15,750,000.

IMMIGRATION RETURNS FROM 1804 TO 1892.

First period	1804—1854, 140,000, or 3,000 a year.
Second period	1855—1885, 498,115, or 16,066 „
Third period	1886—1892, 688,906, or 98,415 „

Total 1,327,021

Italian immigrants, January 1, 1893, 554,000.

NATIONALITY OF THE 191,152 IMMIGRANTS LANDED AT RIO IN 1891.

Italians	116,000	Scandinavians	1,847
Portuguese	30,071	English, Scotch, Irish	1,933
Spaniards	18,668	French	1,309
Poles and Russians	11,598	“Turks”	863
Germans	4,317	Belgians	378
Austrians	2,883	Swiss	198

BRAZILIAN COFFEE CROP AT VARIOUS EPOCHS.

1820	5,085 tons	1880	330,000 tons
1840	68,000 „	1890	490,000 „
1870	132,500 „	1892	444,000 „

POSITION OF BRAZIL IN THE PRODUCTION OF COFFEE (1890).

Brazil	490,000 tons	Cuba and Puerto Rico	35,000 tons
Central America and Mexico	80,000 „	British India	30,000 „
Java and Sumatra	60,000 „	West Africa	20,000 „
Haiti and Santo Domingo	43,000 „	Sundries	100,000 „

Average yearly production of sugar in Brazil : 200,000 tons ; value, £3,200,000.

Average yearly production of rum : 2,200,000 gallons ; value, £160,000.

Production of rubber : (1840), 400 tons ; (1860), 2,500 ; (1891), 20,000.

Production of rubber (1839—1891) : 269,206 tons ; value, £58,000,000.

Horned cattle (estimated), 1893 : 18,000,000.

FOREIGN TRADE OF BRAZIL (1885—1890).

	Imports.	Exports.	Total.
1885	£19,700,000	£29,000,000	£48,700,000
1886	31,000,000	36,000,000	67,000,000
1888	26,000,000	21,000,000	47,000,000
1890	25,900,000	31,000,000	56,900,000

Exports to Great Britain (1891), £4,250,000.

Imports from Great Britain (1891), £8,290,000.

Shipping (1890) : 13,900 vessels of 6,000,000 tons.

COMMERCIAL FLEET OF BRAZIL.

388 sailing vessels	8,555 tons.
136 steamers	81,698 tons.

Total . 524 vessels 90,253 tons.

Railways open (1892), 4,788 miles ; in progress, 2,832 miles.

Telegraphs (1893), 9,000 miles ; despatches, 1,552,000.

Letters forwarded (1892), 36,694,000, or 2·4 per head.

Public schools (1893), 8,000 ; attendance (estimated), 380,000.

Higher schools (1890), 23 ; attendance, 3,485.

Army (1891), 29,000 men ; 1,600 officers ; 15,000 gendarmerie.

Navy (1893) : 3 ironclads, 7 unarmed cruisers, 17 gunboats, 28 other vessels ; total, 63 vessels, 250 guns, 4,000 sailors, 700 officers.

Revenue (1892), £11,000,000 ; expenditure, £12,200,000 ; deficit, £1,200,000.

Public debt (1893) : foreign, £29,500,000 ; internal, £28,000,000 ; total, £57,500,000.

PARAGUAY.

Area, 98,000 square miles ; population (1887), 330,000.

Estimated population (1893), 530,000, or 5 per square mile.

CHIEF TOWNS, WITH ESTIMATED POPULATION (1893).

Asuncion (capital)	35,000	Concepcion	2,000
Luque	9,000	Villeta	2,000
Villa Rica	7,500	Villa del Pilar	2,000
San Pedro	3,500	Ita	2,000
Paraguari	3,000	Encarnacion	1,500

Maté exported (1887), 6,413 tons ; total production, 11,443 tons ; value, £440,000.

Oranges exported (1888), 50,000,000.

Tobacco exported (1886), 4,784 tons ; total production, 10,497 tons.

Live-stock (1891) : cattle, 861,000 ; horses, asses, mules, 104,220 ; sheep, &c., 76,000.

Exchanges (1891), £1,073,000 ; shipping, 2,354 vessels of 307,000 tons.

Railway, 90 miles ; letters forwarded (1891), 1,124,000.

Schools (1891), 292 ; attendance, 18,950.

Revenue (1891), £27,500 ; expenditure, £132,000 ; deficit, £104,500.

Public Debt (1892) : English, £831,000 ; internal, £500,000 ; total, £1,331,000.

URUGUAY.

Area, 72,110 square miles; population (estimated), 1893, 750,000.

	Departments.	Area in sq. miles.	Pop. (est.), 1891.
Salto		4,863	32,000
Artigas		4,392	17,800
Paysandu		5,115	28,400
Rio Negro		3,269	14,300
Soriano		3,560	27,500
La Colonia		2,192	38,200
San José		2,687	21,100
Flores		1,744	15,300
Monte Video		256	234,000
Canelones		1,833	73,800
Maldonado		1,584	20,600
Rocha		4,280	17,500
Minas		4,844	22,500
Treinta y Tres		3,686	15,700
Cerro Largo		5,753	28,000
Tacuarembó		8,074	22,400
Rivera		3,790	19,000
Durazno		5,525	24,200
Florida		4,673	29,500
Total		72,110	701,800

POPULATION OF URUGUAY AT DIFFERENT EPOCHS.

1796	31,000	1860	221,000
1829	74,000	1883	476,000
1852	132,000	1893	750,000

CHIEF TOWNS, WITH ESTIMATED POPULATION (1893).

Monte Video	200,000	Cerro Largo (Melo)	6,000
Paysandu	20,000	Rocha	6,000
Salto	12,000	Santa Lucia	5,000
Mercedes	9,000	Fray Bentos	5,000
San José	7,000	Minas	5,000

IMMIGRANTS LANDED AT MONTE VIDEO.

1835 to 1852	36,000 or 2,000 a year.
1853 to 1872	171,000 or 8,500 „
1873 to 1890	224,000 or 13,000 „

LIVE STOCK OF URUGUAY.

	1860.	1884.	1890.
Horses	740,000	670,000	360,000
Cattle	5,220,000	6,830,000	5,280,000
Sheep	2,590,000	10,540,000	13,760,000
Imports.			
1890	£6,500,000	£6,000,000	£12,500,000
1891	3,800,000	5,400,000	9,200,000

Total exports of animal produce (1890), £1,700,000.

SHIPPING RETURNS (1892).

Entered	12,785 vessels of 4,270,043 tons.
Cleared	12,689 ,, 4,976,905 ,,

Total . . . 25,474 vessels of 9,246,948 tons. .

Railways (1891) : 980 miles open ; 400 miles in progress.

Passengers carried, 630,000 ; goods, 510,000 tons.

Telegraphs : 2,705 miles ; despatches, 233,000.

Letters forwarded, 6,588,000 ; papers, packages, &c., 14,942,000.

Public Schools (1890)	470	Attendance 38,747
Private ,, ,,	407	,, 21,410

Total . . . 877 Attendance 60,157

	1888.	1890.	1892.
Revenue	£2,730,000	£3,000,000	£3,100,000
Expenditure	2,767,000	3,050,000	2,600,000

Public debt (1892) : Internal, £2,370,000 ; external, £18,192,000 ; international, £376,000 ; total, £20,938,000.

Army, 3,500 ; civilian force, 3,260 ; police, 4,000.

	1888.	1888.	1891.
Real Property	£50,000,000	£58,000,000	£52,000,000

ARGENTINA.

Area, 1,125,000 square miles ; population (estimated), 4,086,000.

		PROVINCES.	Area in sq. miles.	Population.
LITTORAL . . .	{	Federal District	70	561,160
		Buenos Ayres	63 000	850,000
		Sante Fé	18,000	240,332
		Entre Rios	45,000	300,000
		Corrientes	54,000	290,000
ANDES . . .	{	Rioja	31,500	100,000
		Catamarca	31,500	130,000
		San Juan	29,700	125,000
		Mendoza	54,000	160,000
		Cordoba	54,000	380,000
CENTRAL . . .	{	San Luis	18,000	100,000
		Santiago del Estero	31,500	160,000
		Tucuman	13,500	210,000
NORTHERN . . .	{	Salta	45,000	200,000
		Jujuy	27,000	90,000
Total			515,770	3,916,492

		TERRITORIES.							
NORTHERN	.	{	Misiones	.	.	.	.	23,932	50,000
			Formosa	.	.	.	.	125,612	50,000
			Chaco	.	.	.	.
CENTRAL	.	.	Pampa	.	.	.	.	191,842	40,000
SOUTHERN (Patagonia)	.	{	Rio Negro						
			Neuquen						
			Chubut	.	.	.	268,000	30,000	
			Santa Cruz						
			Tierra del Fuego						
			Grand Total	.	.	.	.	1,125,156	4,086,492

CHIEF TOWNS, WITH APPROXIMATE POPULATIONS (1893).

MISSIONS FORMOSA, CHACO.

Posadas	3,500
Formosa	1,000
Resistencia	3,500

CORRIENTES.

Corrientes	19,000
Goya	4,150
Caacati	3,500
Libres	2,500

ENTRE-RIOS.

Parana	20,000
Guauguaychu	15,000
Concordia	11,500
Guauguay	11,000
Concepcion del Uruguay	10,000
Nogoya	8,000

SANTA FÉ.

Rosario	75,000
Santa Fé	18,000
Esperanza	3,500

SAN LUIS.

Villa Mercedes	7,000
San Luis	6,000

CORDOBA.

Cordoba	66,247
Rio Cuarto	12,000
Bell-Ville	5,000
Villa Nueva and Villa Maria	4,000
San Pedro and Dolores	3,500

PATAGONIA.

Viedma	1,500
Rawson	1,000
Roca	800
Norquin	500

JUJUY.

Jujuy	5,000
Ledesma	4,500
Humahuaca	600

SALTA.

Salta	18,000
Oran	2,500
Rivadavia	2,000

TUCUMAN.

Tucuman	25,000
Monteros	4,000

SANTIAGO DEL ESTERO.

Santiago	10,000
Loreto	1,500
Salvina	1,500
Atamisqui	1,200

CATAMARCA.

Catamarca	7,000
Fuerte de Andalgala	3,000
Belen	3,000
Tinogasta	2,000

LA RIOJA.

La Rioja	6,000
Chilecito	4,000

SAN JUAN.

San Juan	12,000
Jachal	1,600

MENDOZA.

Mendoza	18,000
San Rafael	3,000

BUENOS AYRES.

Buenos Ayres	580,000
La Plata	66,000
San Nicolas	15,000
Chivilcoy	12,000
Mercedes	10,000
Azul	8,000
Pergamino	7,800
Dolores	7,700
Barracas	7,000
Bahia Blanca	6,500
Tandil	6,300
Chascomus	5,400
Carmen	2,500

POPULATION OF BUENOS AYRES ACCORDING TO NATIONALITIES (1892).

Italians	224,000	English	9,100
Argentines	99,500	Germans	7,500
Spaniards	68,500	Sundries	102,700
French	23,000		

SHIPPING OF BUENOS AYRES (1892).

Entered	3,471 vessels of 2,207,000 tons.
Cleared	2,694 „ „ 1,745,400 „

Total 6,165 vessels of 3,952,400 tons.

Exports of Buenos Ayres (1892)	£15,600,000
Imports of Buenos Ayres (1890)	£10,320,000

SHIPPING OF LA PLATA (1892).

480 steamers of 838,250 tons; 132 sailing vessels of 130,150 tons; 1,611 coasters of 100,480 tons. Total: 2,223 vessels of 1,068,880 tons.

Exports of La Plata (1892), £1,100,000.

Shipping of Bahia Blanca (1892), 390 vessels of 74,645 tons.

Exchanges of Bahia Blanca (1892), £1,712,000.

IMMIGRATION RETURNS OF ARGENTINA.

	Immigrants.	Emigrants.
1889	289,000	40,700
1890	138,000	83,000
1891	73,000	91,000

Excess of immigration over emigration (1871-91), 1,096,000.

LIVE-STOCK OF ARGENTINA (1890).

Horses, 4,400,000; horned cattle, 22,050,000; sheep, 70,450,000.

LAND UNDER CULTIVATION (1891).

Wheat, 3,000,000 acres; maize, 2,100,000 acres; lucerne, 1,500,000 acres; sundries, 915,000 acres; total, 7,515,000 acres.

FOREIGN TRADE OF ARGENTINA.

	1887.	1889.	1891.
Imports	£23,400,000	£33,000,000	£13,400,000
Exports	17,000,000	24,500,000	19,250,000
Total exchanges	£40,400,000	£57,500,000	£32,650,000
	Imports from (1891).		Exports to.
Great Britain		£5,660,000	£3,000,000
France		1,600,000	4,700,000
Germany		1,200,000	2,300,000
Belgium		1,300,000	3,300,000
United States		700,000	840,000
Uruguay		500,000	900,000
Italy		800,000	650,000
Spain		300,000	260,000
Brazil		290,000	1,800,000

SHIPPING OF ARGENTINA (1892).

Entered	9,948 vessels of	6,046,825 tons.
Cleared	9,184 „ „	5,840,025 „

Total 19,132 vessels of 11,886,850 tons.

Railways open (1892): 7,676 miles; in progress, 3,170 miles.

Telegraphs (1892): 19,850 miles; despatches, 2,340,000.

Letters forwarded, 126,534,000.

Public schools (1891)	2,400	Attendance	195,000
Private „ „	833	„	55,000
Total	3,233	Attendance	250,000

Army (1891): 15,600 men; 1,784 officers.

Navy: ironclads, gunboats, torpedoes, &c., of 24,500 tons burden, with 150 guns, and about 1,500 sailors.

Revenue (1891), £10,870,000; expenditure, £18,000,000; deficit, £9,130,000.

Public debt (1892): National	£26,000,000
Foreign	35,000,000
Total	£61,000,000

National debt, with paper money, treasury bonds, and guaranteed interests	£100,000,000
Provincial debts	28,000,000
Municipal debts	9,000,000
Debt of Buenos Ayres	9,200,000

Total liabilities of Argentina £146,200,000

FALKLAND ISLANDS AND SOUTH GEORGIA.

Area of East Falkland	3,000 sq. miles	Population
„ „ West Falkland	2,300 „ „	(1891),
„ „ Smaller groups	1,200 „ „	1,789.
„ „ South Georgia	1,000 „ „	
Capital, Port Stanley ; population, 694.		
	1887.	1889.
Revenue	£8,963	£8,628
Expenditure	9,128	9,720
Imports	66,785	55,716
Exports	107,995	116,102
		1891.
		£11,551
		13,302
		67,877
		130,752

Live-stock (1891): sheep, 667,000 ; cattle, 6,320 ; horses, 3,824.
 Land under pasturage (1891), 2,325,000 acres.
 Shipping (1891), 86,200 tons, of which 18,650 tons are British.





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